NETWORK WORLD

THE NEWSWEEKLY OF USER NETWORKING STRATEGIES VOLUME 5, NUMBER 3 JANUARY 18, 1988

▶ *LAN SOFTWARE*

DBMS bows for OS/2 networks

Microsoft, Ashton-Tate push server-based tool.

BY JIM BROWN
New Products Editor

NEW YORK — Personal computer software rivals Microsoft Corp. and Ashton-Tate last week teamed up to announce a distributed relational data base management system designed to operate on OS/2-based local-area network servers.

The companies said the SQL Server software will allow applications on MS-DOS- or OS/2-based network workstations to share the same data. SQL Server's distributed capabilities will also allow users to access data on multiple servers.

Microsoft and Ashton-Tate are pushing the SQL-based product as a network DBMS standard. The companies say they will encourage developers to write applications that work with SQL Server. Ashton-Tate itself will develop a version of its popular dBase microcomputer DBMS that will be compatible with the product.

Other software vendors, including Information Builders, Inc., Borland International, Inc., Blyth Software, Inc. and Symantec Corp., said they will develop software that will work with SQL Server.

"Ashton-Tate and Microsoft are powerful enough to attract many third parties to develop products that work with SQL Server," said Richard Schaffer, an analyst with New York-

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▶ *ADVANCED NETWORKS*

Broker group designs citywide private net

Securities Industry Association profile

History
Formed in 1972 from the merger of the Investment Bankers Association of America and the Association of Stock Exchange Firms

Membership
550 investment firms

Joint headquarters
New York and Washington, D.C.

Current chairman
SIA Telecommunications and Information Management Committee
Bernard Weinstein, chief information officer, E.F. Hutton & Co., Inc.

SOURCE: SECURITIES INDUSTRY ASSOCIATION

BY KARYL SCOTT
Washington, D.C. Correspondent

NEW YORK — The Securities Industry Association (SIA) has outlined plans for a Manhattanwide private network that will handle voice and data traffic for as many as 60 of the nation's largest brokerage houses, *Network World* has learned.

The SIA is expected to issue a request for proposal this month for the private fiber-optic network. The network will cut users' private-line costs by as much as 42%, according to Bernard Weinstein, chairman of SIA's Telecommunications and Information Management Committee and chief information officer at E.F. Hutton & Co., Inc. That could translate into to-

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▶ *STRATEGIC ALLIANCE*

AT&T, NCR to offer custom retail nets

BY PAUL KORZENIOWSKI
Senior Editor

NEW YORK — NCR Corp. and AT&T entered into a joint marketing agreement last week through which they will offer retailers custom, integrated voice and point-of-sale networks.

At the National Retail Merchants Association trade show here, the industry giants said they will package NCR computers and POS equipment with AT&T private branch exchanges and transmission services to build end-to-end networks that integrate voice and POS systems. An AT&T spokesman said NCR and AT&T will handle network problem determination and will service all but third-party equipment on the network.

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NETWORK LINE

News

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- ▶ Illinois Bell says it will soon file tariffs for ISDN, and pioneer McDonald's announces that it intends to evaluate a mix of new ISDN services. Page 2.
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NEWSPAPER

BUYER'S GUIDE

Powerful DSUs, CSUs monitor and diagnose digital networks

BY JOHN J. HUNTER
Contributing Editor

True or false? Data service units and channel service units have become commodity items and therefore can be purchased on price alone.

For some applications, that's partially true. But for users who are looking for advanced functions or who have an eye on the future, that advice is dead wrong.

Digital services are changing. AT&T, in response to user demands for more control over their networks and better quality transmission facilities, is offering services such as Dataphone Digital Service II (DDS II), Extended Superframe

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▶ *MULTIVENDOR NETWORKS*

Apple and DEC camps unite

BY MARY PETROSKY
Senior Correspondent, West Coast

SAN FRANCISCO — Apple Computer, Inc. and Digital Equipment Corp. announced late last week an agreement to jointly develop products that integrate Apple microcomputers and networks with DEC VAXes and DECnet.

Ken Olsen, DEC's president, and John Sculley, Apple's chairman and chief executive officer, released details of the agreement at a press conference during the MacWorld Expo here.

The companies did not announce any

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INTERNATIONAL MARKETS

AT&T ups its stake in APT

Joint Philips deal key to global plan.

BY PAM POWERS
Senior Editor

MORRISTOWN, N.J. — AT&T said last week it would increase by 10% its stake in a Netherlands-based joint venture with Philips Industries, N.V. formed in 1983 to sell central office switches and transmission equipment in Europe.

The move is further evidence of AT&T's stepped-up efforts to increase international sales, which today comprise about 10% of annual revenue. But analysts said the company has to overcome marketing flaws and formidable trade barriers before it can claim a larger piece of the overseas market.

AT&T described its decision to increase its share of the venture, called AT&T and Philips Telecommunications B.V. (APT), to 60% as a vote of confidence. It is possible, however, that the deal may reflect Philips' discontent with the operation, which has not turned a profit.

APT manufactures the 5ESSPRX, a central office switch that combines technology from both companies, and other transmission equipment sold in Europe and in other selected countries. The company employs about 5,000 people, according to AT&T spokesman Burt Wolder, and competes with international heavyweights such as Alcatel N.V., LM Ericsson and Siemens AG.

Neither AT&T nor Philips would release financial information about the venture, but analysts said it continues to operate at a loss.

Wolder countered analysts' assertions, saying, "The venture made some major sales in 1987 that brought in $500 million. We expect that amount to increase by 20% in 1988. It's a growing venture. We wouldn't be raising our stake otherwise." AT&T expects the operation to become profitable this year.

AT&T's increased share will make it easier for the company to transfer technology developed by Bell Laboratories to the jointly

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INTEGRATED NETWORKS

Illinois Bell prepares tariff for ISDN services

BY BOB WALLACE
Senior Editor

OAK BROOK, Ill. — In a press conference held with early ISDN user McDonald's Corp., Illinois Bell Telephone Co. said last week it will file an ISDN tariff with the Illinois Commerce Commission by the end of the month.

McDonald's, which hosted the event, also announced that it is evaluating newly delivered Integrated Services Digital Network service capabilities, including electronic directories, messaging and calling number identification, and gave a progress report on its participation in the long-running ISDN field trial.

McDonald's uses 100 ISDN Centrex-type lines in its daily business operations and will increase that figure to 400 in March. When the field trial ends in June, McDonald's will begin installing Illinois Bell ISDN services — now called Ameritech Integrated Digital Network services — for 700 employees in its new home office building here.

The new ISDN features being tested by the fast food giant were made possible by the installation last December of a software upgrade on the AT&T 5ESS digital central office switch used to support McDonald's.

Widespread availability of ISDN may come sooner than both users and vendors expect. Grace Jachimowski, a spokeswoman for AT&T Network Systems Group, claimed the company has already received a total of 400 orders for its 5E 4.2 generic central office switch software. This represents about one-third of all central office switches the vendor has sold.

Bonnie Kos, facilities and systems vice-president for McDonald's, said the company will not realize the full service potential and total savings promised by ISDN until it can use ISDN services nationwide. "We need one uniform ISDN network to serve our headquarters, regional sites and restaurants," she said. "Users have to push the BOCs to offer ISDN services."

The new switch software enables McDonald's to diagnose Centrex service problems, track problem reports and review traffic data. McDonald's is also using a special Illinois Bell-provided terminal and keyboard, known as ISDN-Mate, to perform station moves, adds and changes.

Kos estimated the company

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Network World wants to make its news coverage even better, and for that we ask your help. If you know of an interesting event that just occurred or is about to occur, please call. We'd also like to know how you optimize your networks. Call Editor Bruce Hoard toll free at (800) 343-6474.

WIDE-AREA NETWORKING

Timeplex introduces X.25 packet line to U.S. mart

BY JOSH GONZE
Senior Writer

NEW YORK — Timeplex, Inc. extended its wide-area networking offerings last week with the domestic introduction of a line of X.25 packet-switching equipment formerly sold only overseas.

The new product line, the Timepac series, includes two packet switches and two packet assembler/disassemblers. Analysts lauded the switches for their distributed, modular architecture and several unusual features, but they said Timeplex faces rough competition in the generally mature U.S. packet-switch market.

"This is basically an announcement to let everybody know that they are serious about the X.25 market," said Jeremy Frank, program director for enterprise networking strategies at Gartner Group, Inc., a consulting firm in Stamford, Conn.

The products are manufactured by a Dallas-based unit of Timeplex called Cygnus, formerly Cygnus Computer Corp. Timeplex had an OEM contract with Cygnus in 1986 and bought the company in September 1987.

Timeplex's move into the packet-switch market mirrors an industry trend toward integration of packet-switched subnetworks into T-1-based networks, analysts said.

"People are taking what used to be separate and distinct networks and merging them at the physical level," said Jeff Matros, president of inTELLIGENCE, Inc., a consulting firm in Cold Spring, N.Y.

Except for the high-end switch, all the Timepac products have been available in the UK and other foreign countries for about 1½ years. Currently, Timeplex has only one U.S. customer using the products, according to Frank.

The high-end packet switch, the Timepac NP500 Nodal Processor, is intended for backbone network applications and supports from four to 28 ports and throughput of 500 packet/sec. It supports synchronous data rates up to 128K bit/sec and asynchronous data rates up to 38.4K bit/sec.

The NP500 is an upgraded version of a switch previously available outside the U.S called the NP200.

The smaller switch, the NP100, can be configured with four, eight or 12 ports and has a throughput rate of 100 packet/sec. It supports asynchronous data rates up to 38.4K bit/sec and synchronous rates up to 19.2K bit/sec.

The switches have a modular architecture that enables so-called 1-to-n redundancy, in which the user can put in fewer back-up cards than normally required for redundancy. "Instead of having to back up each processor or each card, you can have one spare card to back up four cards," Frank said.

The redundant processor is on hot standby, and there is no internal redundancy for the line interface cards.

The switches are also characterized by distributed switching intelligence, where each switch has its own routing tables, instead of having a centralized architecture in which routing intelligence is concentrated in a small number of switches. "Every node has the ca-

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DATA DELIVERY/ NET MANAGEMENT

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LOCAL NETWORKING

Citing increased demand for local and wide-area net links, Halley Systems plans a series of internetworking products. **Page 17.**

COMMUNICATIONS MANAGER

Companies comb the industry for communications personnel with the rare combination of management skills plus technical know-how. **Page 19.**

NEW PRODUCTS AND SERVICES

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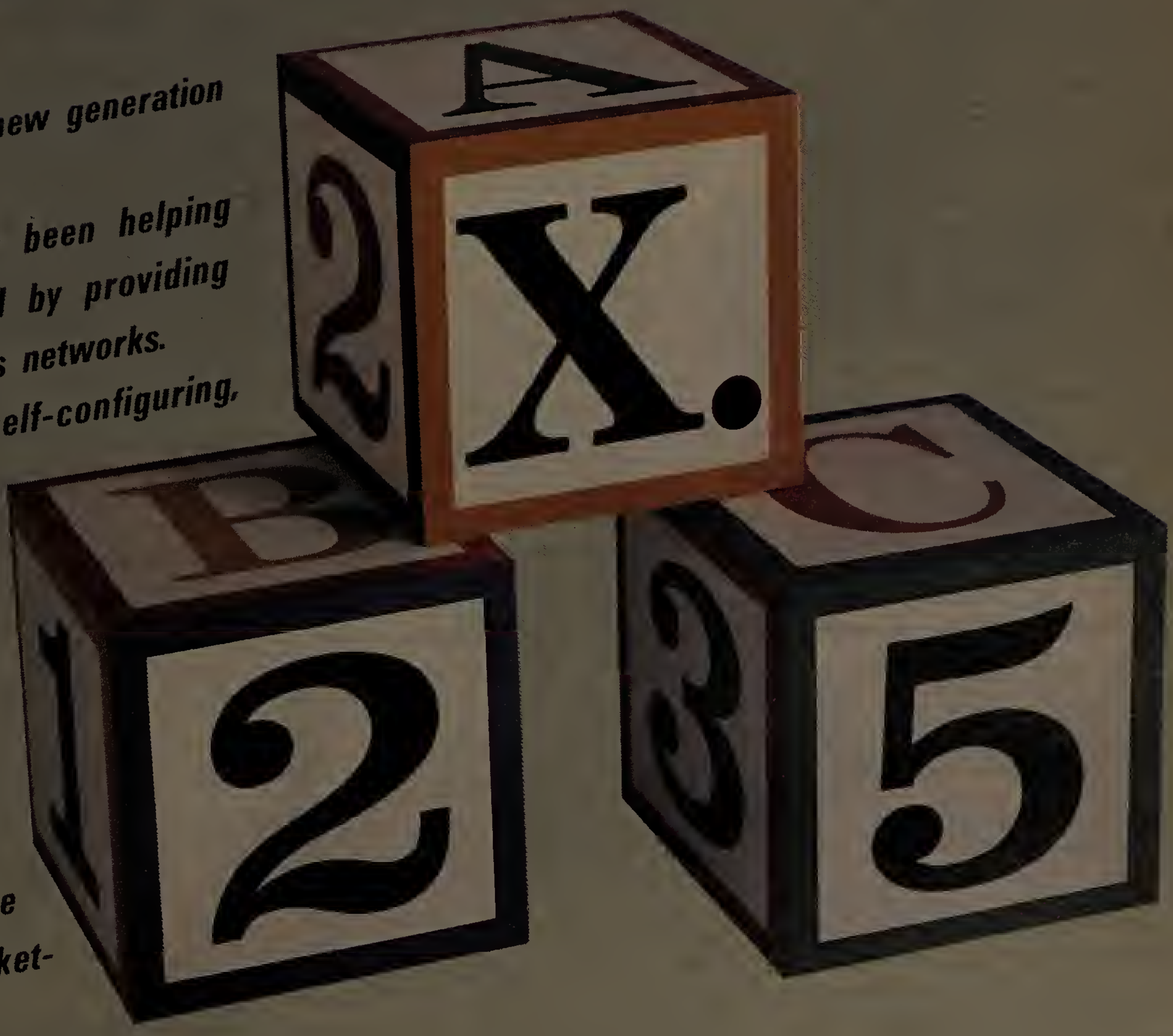
CALENDAR **Page 39.**

Packet switching is as easy as . . .



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▶ *VOICE MAIL*

Bell Atlantic, PacTel get OK for messaging

But still need Judge Greene's approval.

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — The Federal Communications Commission last week approved plans by Bell Atlantic Corp. and Pacific Telesis Group to provide voice-messaging services.

The services, approved under the FCC's Third Computer Inquiry Comparably Efficient Interconnection (CEI) rules, still require final approval from U.S. District Court Judge Harold Greene.

CEI is one component of the FCC Computer III rules. It requires the regional Bell holding companies to provide full access to basic transmission services for competitors that offer enhanced services — a type of equal access for enhanced service providers.

The RBHCs are also required to charge their competitors the same rates for transmission and switching that they use to calculate the cost of their own enhanced services.

The FCC's action, announced at a public meeting last week, points up a potential conflict between Computer III and the Modified Final Judgment rules administered by Greene.

Computer III is designed to allow the RBHCs to develop and market information services as part of their basic telephone businesses. Prior to Computer III, the RBHCs were required to establish separate subsidiaries for the provision of enhanced services.

The 1983 antitrust rules restricted the RBHCs from selling information services, although last September, Greene amended the decree to allow the Baby Bells to offer a limited range of services. Greene said the RBHCs could not market content-based information services but could provide the underlying transport services.

Greene is expected to release a clarification of that order soon, spelling out the specific types of offerings the RBHCs may sell. The RBHCs hope that ruling will permit voice-messaging services.

The FCC's action points up a potential conflict between Computer III and the Modified Final Judgment rules administered by Greene.

If not, Bell Atlantic and Pacific Telesis said they will ask Greene for a waiver of the Modified Final Judgment restriction.

Both companies hailed the FCC's action, despite the apparent complications. "The good news for our customers is that message storage is only one of many services we're prepared to offer if Judge Greene removes the information services restrictions," said David Barry, Bell Atlantic vice-president of federal regulatory affairs.

Under its CEI plan filed with the FCC on March 6, Bell Atlantic plans to market a voice-messaging and storage service to business and residential customers. The service would first be available through Bell Telephone Co. of Pennsylvania.

Pacific Telesis' proposal, filed July 2, includes two types of voice mail services. The first allows customers to store messages in PacTel's central office voice-messaging system. Incoming messages could also be stored for later retrieval by the subscriber.

The second option would allow a caller to leave a message in the voice-messaging system for multiple recipients. The services are designed for both business and residential users.

These services will be available in California from Pacific Bell and in Nevada from Nevada Bell.

Both plans complied with the CEI requirements, with one exception, the FCC said. Neither RBHC complied with the rules requiring periodic reports to the FCC on the quality and reliability of service provided to competing enhanced service providers.

The RBHCs will have to demonstrate to the FCC that they will not provide inferior-quality service to their competitors, according to the FCC statement released after the meeting.

In other action, the FCC considered a number of industry requests for changes in the Computer III rules. Chief among them was a request by the RBHCs that protocol conversion be classified as a basic tariffed service.

The FCC upheld the enhanced service classification for protocol processing; and as such, it is still subject to the Computer III rules.

On another matter, the FCC endorsed industry plans for the construction of a sixth transatlantic communications cable between the U.S. and Europe in the next decade. Some 20 U.S. and European telecommunications organizations will participate in the TAT-9 project. ◘

▶ *IEEE WEIGHS FOUR PROPOSALS*

Twisted-pair Ethernet debate heats up

BY MARY PETROSKY
Senior Correspondent, West Coast

IRVINE, Calif. — With four proposals now on the table, the IEEE group working on a standard for implementing Ethernet over nonshielded twisted-pair wiring faces the sticky task of coming to a consensus on a single scheme.

In a meeting here last week, the Institute of Electrical and Electronics Engineers 802.3 10BaseT study group heard three new proposals for a standard, including a joint presentation by Digital Equipment Corp. and 3Com Corp.

David Systems, Inc. filled in the details of its proposal, while Chip-Com Corp. joined with an Israel-based company in making yet a third proposal.

Another group of vendors, including SynOptics Communications, Inc., Ungermann-Bass, Inc., Wang Laboratories, Inc., Hewlett-Packard Co. and Western Digital Corp., is backing a proposal submitted at an earlier meeting.

Although the study group hopes to agree on a single proposal by March, technical and economic considerations could be clouded by political wrangling. DEC and 3Com, along with SynOptics, are already shipping products for implementing 10M bit/sec Ethernet over nonshielded twisted-pair wire.

DEC and 3Com codeveloped and are comarketing the same technology and have based their proposal on it. In addition, SynOptics is marketing an Ethernet-over-twisted-pair product based on the proposal it supports. Because of the time and money these companies have invested already, each would like to see its proposal adopted.

3Com's Robert Metcalfe, senior vice-president of technology, said he would rather see no standard adopted than to see the SynOptics proposal become the standard. DEC and 3Com maintain that their customers together represent the largest installed base of Ethernet users in the world. "I would prefer a political failure than the acceptance of SynOptics' proposal," he said.

Each of the proposals has its merits, the vendors claimed.

One of the key differences between the DEC/3Com proposal and the other three proposals under consideration is in how the twisted-pair wiring is used.

Under the DEC/3Com scheme, a single pair of wires would carry both send and receive signals. All three of the other proposals call for one twisted pair to carry send signals and one pair to handle receive signals.

The DEC/3Com proposal also allows for multiple coaxial cable connections to be supported by a single twisted-pair connection. This capability offers the best means

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▶ *AT&T LINE-CONDITIONING SERVICE*

D6 to buoy 19.2 users

BY JIM BROWN
New Products Editor

BASKING RIDGE, N.J. — AT&T announced plans last week to develop a new type of line conditioning for analog voice-grade private lines that will help 19.2K bit/sec modems sustain their optimal transmission speed.

The new line conditioning service, termed D6, is being developed in response to the growing use of private-line modems capable of operating at up to 19.2K bit/sec, AT&T officials said. D6 is currently being devised by AT&T engineers and will complement AT&T's series of C and D line-conditioning options. Those services guarantee that a private analog line will meet certain technical specifications.

Analysts and modem makers hailed the news and said D6 will be a boost to 19.2K bit/sec modem users. "By developing D6 conditioning, AT&T is accepting that high-speed analog data communications is going to stay with us," said Steve Mullins, modem product line manager at Middlebury, Conn.-based General DataComm, Inc. That company introduced its DataComm 19202 19.2K bit/sec modem last fall and expects to start shipments within the next month.

Currently, 19.2K bit/sec modems require at least D1 line conditioning in order to operate. But even with D1 conditioning, some 19.2K bit/sec modems encounter high error rates that force them to operate at fallback rates of 16.8K bit/sec or 14.4K bit/sec.

"Some modems, by the luck of the draw, have been put on a combination of AT&T and local carrier lines that enable them to run at 19.2K bit/sec," said Ron Kornet, AT&T voice-grade private-line product marketing manager. "What we'd like to do now is guarantee certain line parameters so that people trying to run [modems] at 19.2 can have a much greater success rate," he said.

Even when a modem is able to achieve the 19.2K bit/sec rate, it sometimes experiences higher-than-expected error rates, analysts said. High error rates force the modem to retransmit data packets, thus preventing it from achieving its rated throughput.

"Modem makers will tell you that you can get 19.2 over a standard voice line, but they don't tell you the bit error rate may be high," said Mark LaRow, group manager of network design and management systems for Fairfax, Va.-based Network Strategies, Inc.

D6 is being developed to correct the problems 19.2K bit/sec modems encounter.

"We've examined a number of modems in order to determine what line parameters they need to operate successfully at 19.2K bit/sec. Then we're going to publish and meet those parameters," Kornet said. It may take up to six months to finalize the new conditioning parameters, he said.

The specifications will be made available to modem makers, who can then design products to take advantage of D6 conditioning.

Scott Bagnall, product manager for analog access products for modem maker Racal-Milgo, Inc. of Sunrise, Fla., estimated that 30% to 40% of users with the firm's RM-1916 19.2K bit/sec modem reported the product does not achieve optimal speed on D1-conditioned lines. Those units, he said, operate at the fallback rates of 16.8K bit/sec or 14.4K bit/sec.

"For the most part, it takes better than D1 conditioning to achieve 19.2," Bagnall said. "D6 will be a welcome addition if it solves the problem," he said.

Although it is not known what specifications are needed to provide D6, LaRow, who is an electrical engineer, said AT&T's approach of observing lines that currently support 19.2K bit/sec speeds is the right one.

"It is impossible to predict which specifications will enable the line to support 19.2," LaRow said. "But modem makers have made 19.2 possible on a voice-grade lines. Now it's time for AT&T to make a circuit that can support that consistently."

DBMS bows for OS/2 networks

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based Technologic Partners, which publishes the "Computer Letter," a newsletter for venture capitalists.

When released in the second quarter, SQL Server will run on Intel Corp. 80286 or 80386 microprocessor-based IBM Personal Computers or Personal System/2s. Those microcomputers would run Microsoft's OS/2 operating system and either Microsoft's LAN Manager or IBM's LAN Server local network software for OS/2.

SQL Server is one of the first major applications developed to take advantage of the advanced capabilities of OS/2. Because it uses OS/2's multitasking and multiuser capabilities, SQL Server will be a vast improvement over existing local network DBMS systems, analysts said.

Network DBMSs work only with compatible applications, and they download files from a server to a Personal Computer, which must sort through the file to pluck out needed data. With SQL Server, the server will download only the requested data.

"This product is beginning to take advantage of the power of OS/2 on a server," said David Marscak, an analyst with Boston-based Patricia Seybold's Office Computing Group.

"It is much closer in performance to IBM's DB2 on a mainframe than a networked version of

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Group designs citywide net

continued from page 1

tal savings for participating brokerages of nearly $111 million over 10 years.

SIA declined to comment on the estimated value of the contract or to release the names of the participating firms. SIA represents 550 investment firms.

Weinstein said the private-line network will support 20,000 point-to-point circuits linking New York-based brokerage firms and their traders on the floors of the New York and American stock exchanges. The network will also link brokerages to one another and to long-haul carriers and local facilities. The network will use fiber-optic transmission facilities and will provide state-of-the-art voice and data capabilities to end users, he said.

The driving force behind the creation of this shared private network is cost. "SIA members want to lower their telecommunications costs, and they want to stabilize rates," Weinstein said. "Local private-line rates have increased dramatically in recent years, and it's very difficult to budget for telecommunications costs because the changes have been so frequent.

"With a private network, we should be better able to plan our telecommunications expenses and make some long-range projections," he said. "Our communications systems are too important — critical, really — not to have control over them."

Even though the participating brokerages are competitors, the firms are hoping to achieve networking economies of scale, building a private net beyond the reach of any individual company.

Network configuration

The intra-Manhattan network will connect 124 office buildings and will initially have between 15,000 and 30,000 terminations, depending on network topology, according to SIA's preliminary RFP. The network will consist of one central control node connected to a fiber-optic ring linking individual office buildings. High-traffic offices will have their own nodes as well.

The network will employ digital cross-connect technology, and circuits will be multiplexed at DS1 (1.544M bit/sec) and DS3 (45M bit/sec) speeds and above.

The central node will operate in a circuit-switch mode and will handle all incoming traffic. It will also route off-network traffic to the appropriate carriers. The network will have a point of presence (POP) at each of the major interexchange carriers' nodes in Manhattan.

The network will satisfy all types of circuits used in the trading environment, such as manual or automatic ring-down circuits used with trading turrets (60- to 90-line terminals), tandem trunks between customers' private branch exchanges, data circuits and broadcast circuits for stock quotes.

The contractor will be required to supply all equipment including fiber cable, channel banks, digital access and cross-connect systems, multiplexers, modems and a computer system to manage the network. The winner of the contract will also handle billing, station moves and changes, and service dispatching.

In addition, the vendor will be responsible for total network maintenance, support and staffing, according to the RFP. Bids will be due 45 days after the RFP is issued, and an award is expected to be made by six months from then. The network must be completed within 18 months of the award.

Weinstein said the firms participating in the project typically spend between $3 million and $4 million a year each on local private-line service. "The majority of firms lease private lines from New York Telephone Co., and we don't get any special rates, no matter how much transmission capacity we use," he said.

When asked if current uncertainty in the stock market could imperil the network project, an SIA spokesman said, "The current market situation makes it even more imperative that we implement a more cost-effective system."

Other factors driving the project include the need for greater network flexibility and improved services.

"We expect to be able to change the network and implement new features more easily than is now possible with our telephone company-provided private lines. The ability to add features quickly and cost-effectively is a big plus," Weinstein said.

"Reliability is one of the key factors driving the SIA network," said Dorothy Millhofer, senior manager of communications research at Ernst and Whinney, Inc. in New York and a consultant to the brokerage community.

"The investment industry cannot tolerate any service outages because of the nature of the trading business. If a trade doesn't go through, the brokerage assumes liability for any lost revenue," she said.

Service failures typical

Service failures in the Broad Street area, where many of the brokerage firms are located, are typical, due to antiquated analog switches in the public network, Millhofer said. "These switches can't handle the volume of traffic generated in this area, and they constantly overload."

While SIA declined to speculate on possible bidders for the lucrative networking contract, industry analysts familiar with the project said Nynex Corp. and AT&T would be two likely contenders. Other carriers and specialized service providers in Manhattan, such as Merrill Lynch Teleport Communications, Inc. and Locate, Inc., two bypass providers, are also potential contenders.

dBase III is," said John McCarthy, director of the professional automation service at Forrester Research, Inc. of Cambridge, Mass. DB2 is IBM's mainframe-based relational DBMS based on SQL.

While some observers say SQL Server competes against IBM's OS/2 Extended Edition — which features advanced data management capabilities — most analysts said the two approaches differ.

SQL Server is designed to enable users with a mix of applications to access a common set of data. OS/2 Extended Edition will enable a personal computer to access larger processors and transparently download data.

Under the SQL Server arrangement, requests for data on a server will be handled by a so-called application front end. The front end will transform those requests into SQL commands and route them over the network. SQL is a language by which applications communicate with a relational DBMS.

SQL Server will process the commands and return the needed data to the user. SQL Server will then update the data base with any changes the user has made.

SQL Server has the potential to do for OS/2 what Lotus Development Corp.'s 1-2-3 spreadsheet did for MS-DOS, McCarthy said. Lotus' 1-2-3 was one of the first MS-DOS applications users found productive. SQL Server holds the same potential for OS/2, he said.

Microsoft licensed SQL Server from its developer, Sybase, Inc. of Berkeley, Calif. Sybase markets versions of the software that run on Sun Microsystems, Inc. workstations, Digital Equipment Corp. VAXes and Pyramid Technology Corp. minicomputers. SQL Server will be able to link to Sybase's implementation of the software, which is generally regarded by analysts as a solid product.

Microsoft will license SQL Server to hardware vendors such as personal computer and file server manufacturers. Ashton-Tate will license the software from Microsoft and distribute it through retail channels under the name Ashton-Tate/Microsoft SQL Server.

Expected to cost between $1,500 and $3,000, SQL Server runs on IBM Personal System/2s or IBM Personal Computer AT with 2M bytes of random-access memory and a 10M-byte hard disk.

▶ *ETHERNET NETWORKS*

FiberCom details plan for FDDI migration

BY JOSH GONZE
Senior Writer

ROANOKE, Va. — FiberCom, Inc. last week announced a migration plan for Ethernet users contemplating a move to high-speed local networks based on the emerging Fiber Distributed Data Interface (FDDI) standard.

Under the plan, users of FiberCom's fiber-optic Ethernet network, called WhisperNet, can put 100% of the cost of their network transceivers toward the cost of future FDDI transceivers. The devices are interchangeable because the WhisperNet fiber cable plant is identical to the FDDI cable plant, according to FiberCom.

FDDI is the still-unfinished ANSI standard for 100M bit/sec fiber-optic local networks. Although the specification is not expected to be completed until the third quarter of 1988, FiberCom and several major computer vendors are already developing FDDI products.

FiberCom expects its first FDDI product — a bridge connecting a fiber backbone to an Ethernet or token-ring subnetwork — to be available in the summer of 1989.

FiberCom's WhisperNet runs at 10M bit/sec, the standard Ethernet data rate, but uses fiber-optic cable instead of traditional coaxial cable. When FDDI transceivers are available, WhisperNet users will be able to preserve their existing cable and simply trade in their Ethernet transceivers, according to Albert Bender, president of the company.

In addition to providing current WhisperNet users with a migration path, the offer is aimed at attracting potential customers who are hesitant to invest in available Ethernet technology because they are afraid FDDI will make it obsolete, Bender said.

"No one wants to buy a dinosaur," Bender said. "This program provides a migration path for users to live through this gray period of uncertainty about when the FDDI products will reach the market. Because of that uncertainty, it becomes a hedge of their bet, in terms of providing capability now without sacrificing the investment."

Rich Ahrendt, network systems specialist at Tektronix, Inc., a diversified electronics manufacturer in Wilsonville, Ore., said, "We'd like to run as much fiber as possible, because we'd like to go to FDDI. But since we can't do that yet, this is their way of helping us prepare."

Ahrendt said FiberCom's fiber transceivers, although more costly than standard Ethernet transceivers, are likely to be price-competitive with other fiber transceivers on the market.

Thus, the incentive program could only sweeten purchases of FiberCom's products. He also said that, leaving aside the transceivers, the cost of fiber-optic cable is about the same as that of coaxial cable.

Tektronix employees are already using 60% of the bandwidth available on their WhisperNet, so FDDI networks can't come soon enough for them. "We're even talking about just doubling the Ethernet, putting in bridge repeaters and doubling it to 20M bits," said Dennis Trussell, network specialist at the company.

AT&T ups its stake in APT

continued from page 2

owned company for implementation, Wolder said. As a majority owner, AT&T no longer has to carry out the procedural formalities associated with using proprietary technology in a 50%-50% venture.

AT&T intends to introduce new products through the venture this year, including fiber-optic cable and other transmission products.

The AT&T/Philips alliance is a critical piece of AT&T's strategy to generate an increasing percentage of its revenue from foreign markets. Today, AT&T garners about 9% of its sales from outside the U.S., but Chairman James Olson has in recent months voiced a strong commitment to increase international sales to 25% of revenue over the next five years.

According to AT&T spokeswoman Marj McKean, a large portion of AT&T's international revenue today is contributed by international calls made to the U.S. over the public network. That will grow, she said, but AT&T is also looking for dramatic increases in international sales of computers and switching and transmission gear.

AT&T plans to sell that equipment through alliances with influential vendors in Europe and Asia. In partnership with Ing. C. Olivetti & Co, S.p.A., AT&T markets its computer line in Europe. Although that relationship as yet seems to have done little to bolster computer sales at home or abroad, McKean said international sales volume of AT&T computers is growing.

AT&T also has relationships, among others, with the Spanish Telefonica Post, Telegraph and Telephone administration for the production and sale of custom chips to sell in Spain, with Ricoh Co., Ltd. to sell the Merlin key system line in Japan and with Lucky Goldstar in Korea to manufacture and market the 5ESS and fiber-optic cable to sell in Asia.

"Joint alliances will help, but, judging from AT&T's attempts to penetrate Canada, I would say they have a problem realizing that a foreign country isn't the 51st state," said Ian Angus, president of Toronto-based Angus TeleManagement Group, Inc., a consulting firm. "They have to learn the [international] market, and, even if they do, Europe is tough to crack, because each country has its preferred state-owned supplier."

Fulton Holmes, a financial analyst with the New York investment firm Thomson McKinnon Securities, Inc., said AT&T no longer "expects any immediate returns" from its attempts to penetrate Europe but is instead looking to establish long-term relationships for long-term gains. "AT&T is making subtle moves in Europe with its alliances, some of which we probably don't know about yet. It is trying to get in on joint projects to establish trust with state-owned companies and governments overseas."

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NETWORKING

▶ *NETWORKING STRATEGIES*

Centralization proves profitable for Corning

Allows it to build on IBM, DEC nets.

BY MARY PETROSKY
Senior Correspondent, West Coast

CORNING, N.Y. — Centralizing control of corporate information services a year ago is helping Corning Glass Works, Inc. implement a computer networking strategy that unifies and builds on the strengths of the company's IBM and Digital Equipment Corp. environments.

The network strategy is helping Corning improve connectivity between scattered corporate facilities, improve network performance and cut costs by maximizing existing telecommunications facilities. A broader benefit of the strategy is increased information flow throughout the company's large campus, according to William Ray, manager of telecommunications and office services. Tying the various divisions' computer equipment together will allow management "to make more informed and rapid decisions," Ray said.

Corning is a decentralized organization, with four building complexes spread across several miles within the Corning area, as well as locations in other states. The company has three networks: a voice network, an IBM Systems Network Architecture network and a DEC DECnet network.

Under the centralization plan, the vice-president of information services was given direct responsibility for the information services business managers in each division, managers that had previously operated more or less autonomously.

The plan also centralized responsibility for data communications within the corporate telecommunications group and consolidated applications development and other corporate resources.

The reorganization helped highlight computing problems, and once these were addressed, the networking solutions fell into place, Ray said.

Perhaps the biggest data issue tackled was uniting the IBM and DEC environments, which had always been maintained separately. DEC equipment and networks had proliferated in Corning's engineering and manufacturing divisions, while IBM equipment and SNA dominated the corporate data center.

After the reorganization, the decision was made to retain both environments due to their relative strengths. DECnet was accepted as the production network that would support Corning's primary office automation effort. The IBM network and equipment were retained to support the company's data base management, financial applications and transaction-processing needs, Ray said.

As in the past, the remote DEC sites continued to communicate with the IBM systems for payroll information, order processing and other applications. But the communications links between the two environments have been modified.

Before the reorganization, each remote DEC site was outfitted with a DEC SNA gateway to provide access to the central IBM environment. DECnet traffic bound between remote sites was piggybacked on the SNA network links using multiplexers.

Under the new network strategy, the DEC SNA gateways — which Ray said are costly — have been centralized at the corporate data center where they can be shared by remote VAXes. For the most part, the network links support only DECnet protocols. Sharing the bandwidth between the two protocols meant lower transmission speeds for all users, Ray said.

Using the entire bandwidth of the leased lines for DECnet sped up data transmission, Ray said. "The real benefit is that we're not splitstreaming the communications line anymore."

Traffic at the data center is routed by newly installed DEC routers. Data intended for the IBM environment is sent over a short Ethernet segment to a DEC SNA gateway and, from there, fed into an IBM communications processor in front of an IBM host.

Data bound for other remote sites is simply routed back out over the leased lines supporting those locations. In effect, Corning has established one large logical DECnet network.

Ray pointed out that Corning's data traffic volumes are low enough to allow the company to use DECnet as the primary communications method. "Some companies might not be able to do that because they have very high traffic volumes," which would be better handled by an SNA network, Ray said.

In addition to centralizing its DEC SNA gateways, the Corning network project leveraged a campuswide fiber network the company used to link Ethernet networks. These networks had been linked via short-haul leased lines running at 9.6K bit/sec. The fiber backbone was put in several years ago to accommodate voice and data traffic, running at 64K bit/sec and lower speeds.

Last May, Corning began using the fiber backbone to provide 10M bit/sec connections for the Ethernets, which provided higher speed connections and made it easier for users to share resources on those networks, Ray said.

"Oftentimes, you cannot justify networking from a conventional accounting standpoint. You have to recognize the advantages of tying the company's computer resources, of more rapid information access," Ray said.

▶ *DIGITAL SERVICES*

US Sprint begins rollout of new line

BY BOB WALLACE
Senior Editor

NEW YORK — Looking to capture a share of the private-line market, US Sprint Communications Co., as expected, last week introduced Clearline T1.5, the first in a series of new digital services it plans to announce by year's end.

Clearline T1.5, a flat rate-priced T-1 service to be provided over US Sprint's fiber network, was introduced to 200 of its users at the World Trade Center here ("US Sprint to broaden digital data offerings," *NW*, Jan. 11). US Sprint also revealed plans for a voice-grade private-line service, a family of digital data services and a 45M bit/sec transmission offering.

US Sprint users were generally pleased with the service announcement but said they reserved judgment on whether to sign up for the offerings. Bard Haerland, staff vice-president of worldwide telecommunications for Unisys Corp., said, "US Sprint will have to prove they can run a nationwide T-1 network better than anyone else before they get my business."

US Sprint Chief Executive Officer Richard Snedaker and heads of both United Telecommunications, Inc. and GTE Corp. were present at the introduction of Clearline T1.5, a point-to-point service. The addition of Clearline T1.5 and other digital data services will enable the carrier to pitch a full range of voice and data services to its users.

Although US Sprint claimed Clearline T1.5 service will cost 22% to 44% less than AT&T's Accunet T1.5 service, the carrier refused to divulge comprehensive service pricing and availability information. The company said the service would require a 60- to 150-day installation lead time. The specific lead time depends on the length of the circuit, the cities and local exchange carriers involved.

US Sprint claimed the cost of a 500-mile Clearline T1.5 circuit that is not bought under a long-term contract would be 22% less than an AT&T Accunet T1.5 circuit.

As anticipated, US Sprint will offer Clearline T1.5 at flat rates under one- to five-year fixed con-

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▶ *LOW-END MULTIPLEXERS*

DCA offers 9000-S T-1 mux

BY BOB BROWN
Staff Writer

ALPHARETTA, Ga. — Digital Communications Associates, Inc. (DCA) last week introduced a smaller version of its System 9000 T-1 multiplexer designed for use in corporate branch offices.

The System 9000-S supports up to eight T-1 trunks and is hardware- and software-compatible with the company's larger System 9000 multiplexers, said Meg Owens, a company spokeswoman.

The new multiplexer uses the same line interface cards as the other System 9000 family members and can be located anywhere in a DCA T-1 network, according to Debbie Tsusaki, System 9000-S product manager. It is also possible to control and configure the device using DCA's Network Management System.

As with the company's larger multiplexers, the System 9000-S supports both pulse code modulation (PCM) and adaptive differential pulse code modulation (ADPCM). PCM supports 24 64K bit/sec voice channels per T-1, and ADPCM enables up to 44 channels to be squeezed into a 1.54M bit/sec digital T-1 pipe.

Data speeds supported range from 1,200 bit/sec to 1.536M bit/sec, Tsusaki said. While T-1 networks historically have been considered cost-effective only for high-traffic sites, the System 9000-S makes T-1 worthwhile for low-volume locations.

Users in some regions could cut expenses by replacing as few as five tie lines with a T-1 link and the System 9000-S, Tsusaki said. The falling cost of intra-local access and transport area T-1 spans makes this alternative viable.

"This is a trend that is accelerating as the regional Bell holding companies reduce T-1," said Rick Kimball, an analyst at Montgomery Securities in San Francisco. "That's why there's a need for this product."

Metropolitan companies with scattered offices within the same local calling area, small companies and existing DCA customers who want to link small sites to main offices are all potential System 9000-S users.

"This product will serve as a feeder node to larger nodes in an existing DCA network and as an entree into the smaller node marketplace," Kimball said. "It's a good size. It's not large compared to DCA's other multiplexers [which accommodate between 16 and 36 T-1 trunks], but it is compared to other multiplexers on the market."

The multiplexer will be available by the third quarter of 1988. It will be priced between $25,000 and $40,000.

INDUSTRY UPDATE

Northern Telecom sells Spectron division

Northern Telecom, Inc. said it will sell its Spectron division to General Signal Corp. for an undisclosed amount. General Signal's Telenex Corp. subsidiary markets data communications test equipment similar to equipment made by Spectron. Company officials said the two operations will be merged.

BRIEFS

Michigan Bell Telephone Co. recently asked the Michigan Public Services Commission (PSC) for greater flexibility in pricing and marketing its competitive services. In exchange, Michigan Bell would keep basic telephone rates among the nation's lowest.

The proposal is in line with a new state law authorizing the Michigan PSC to use flexible regulation for services where competition exists. The law's ultimate purpose is to deregulate those services.

Changes in basic rates during the three-year trial period would be linked to the Consumer Price Index. Competitive services would include long-distance, business systems and coin telephones, as well as operator services and billing.

Southwestern Bell Telephone Co. recently joined the Corporation for Open Systems (COS) as a senior research partner.

The partnership will benefit Southwestern Bell as both a user of data and telecommunications technology and as a service provider, the company said.

COS is a nonprofit research and development organization dedicated to introducing standardized, interoperable multivender products and services. It has about 70 major information and communications companies as members.

Digital Equipment Corp. of Maynard, Mass., recently signed an agreement with **The Data Group Corp.**, a Nynex Corp. subsidiary in Burlington, Mass., to jointly market the latter's VAX/VMS-based Fieldwatch field service management system.

The Systems Cooperative Marketing Program Agreement will allow the companies to supply computer system solutions to field and customer service departments of corporations and institutions worldwide.

Fieldwatch addresses all the administrative functions of operating a field service organization of any size, the companies said. It is installed at 170 sites worldwide.

Network Innovations Corp. of Cupertino, Calif., recently agreed to modify its Multiplex personal computer-to-host data access software via a joint marketing and development deal with **Sybase, Inc.** of Berkeley, Calif.

Under the agreement, the firms will market Multiplex as a link between personal computer applications and the Sybase relational data base management system.

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▶ *INTERVIEW*

Start-up pro talks of LAN challenge

Paul Severino shares market strategies.

Paul Severino has made his mark on a number of start-up companies since he first joined Digital Equipment Corp. as a design engineer in 1969. Most notably, he founded Interlan, Inc., known now as Micom-Interlan, Inc.

He is currently president and chief executive officer of start-up Wellfleet Communications, Inc., a maker of local network servers that recently introduced its first product. Network World *Senior Editor Pam Powers asked Severino about the future of the local-area network industry and the role he sees his company playing in that market.*

What prompted you to start Interlan?

I was involved in networking at Prime [Computer, Inc.], which was one of the first companies to get involved in local networks.

In 1980, the Blue Book Ethernet specification was published and backed by DEC, Xerox [Corp.] and Intel [Corp.] DEC lined up behind Ethernet, and Intel said it was going to build chips. I felt the time was right to bring product to market, and I had a lot of experience in building add-ons and boards for DEC machines. So I focused on board-level products for DEC computers.

Interlan was a very successful company. We went from zero to $18 million in revenue in 3½ years. It had a different focus from other vendors like Ungermann-Bass and Bridge [Communications, Inc.] We sold a lot to integrators and through OEMs.

Paul Severino

But Micom [Systems, Inc.] came along and offered us an acquisition that was hard to refuse. The numbers were right, and we felt we needed more marketing clout to go forward. So we were acquired in 1985.

What do you think about that acquisition?

Micom was in a much different business, and they had a different view of management than the entrepreneurial view we had. So there were lots of changes, and lots of people did other things.

The acquisition caused a year's hiccup, but now it's really moving along nicely. You learn an awful lot about the effects of acquisitions — how to do them right and how not to do them well.

I stayed at Interlan about six months after the acquisition, and I felt that the things I wanted to do were quite different from what Micom wanted me to do.

They wanted me to be a corporate person setting the technological direction of the company, which I enjoy doing, but I didn't think there was the opportunity for me to have the impact I wanted.

It took me another six months to realize I wanted to start a company like Wellfleet.

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▶ *ON-LINE INFORMATION SERVICES*

Investors reap data boon from Lotus

BY BOB BROWN
Staff Writer

CAMBRIDGE, Mass. — Stock market players have found that there is more to Lotus Development Corp. than its best-selling spreadsheet product, 1-2-3.

Since the fall of 1985, Lotus has marketed two real-time stock quotation systems, Signal and QuoTrek.

Signal delivers real-time market quotations to personal computer users via FM sideband transmissions. The stock information can be fed directly into Lotus' spreadsheet products, 1-2-3 and Symphony, and other financial packages for analysis. The product includes an FM receiver and software.

QuoTrek is a compact, hand-held device that tracks and stores real-time stock information that is also received via FM sideband transmission. To date, QuoTrek has outsold Signal, according to Donald McLagan, vice-president of Lotus' Information Services Division.

Both products let users monitor the trading activities of more than 20,000 issues directly from the floors of major U.S. security and commodity exchanges. Trading information is sent from the exchanges to Lotus Information Network Corp. (LINC) in San Mateo, Calif. It is processed there and sent via satellite to FM stations in 13 U.S. cities and broadcast to Signal and QuoTrek users.

The number of Signal and QuoTrek subscribers has doubled to about 10,000 since the start of 1987, McLagan said.

Subscribers in other parts of the country need to use a small satellite antenna.

"It is beneficial for us to bypass the local telephone system by using FM sidebands," McLagan said. "It doesn't cost us anything to add customers."

The number of Signal and QuoTrek subscribers has doubled to about 10,000 since the start of 1987, McLagan said. Most users are "active individual investors," he said.

Lotus declined to reveal earnings or revenue figures from sales of its stock quote products. The base price for Signal is $595, and QuoTrek's is $450. But the products are important to Lotus, McLagan said, because they provide a continuing revenue stream. Users must pay a subscription fee to Lotus and a fee to exchanges that totals about $200

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Start-up pro talks LAN challenge

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Why did you start Wellfleet?

Local networks are becoming the mechanism by which computers are connected together, whether they are personal computers, workstations, minicomputers or mainframes.

Once you have installed a local-area network, you already have a common system. Now the need is to extend those across long distances, which has been a problem since the 1960s.

Codex [Corp.] and such companies have been addressing remote communications problems, but from the terminal to the host. Now the problem is interconnecting those local nets with a higher level of performance and with protocols that allow things to be done transparently.

When you're on your personal computer on your internal network, you do things transparently, and you would like to keep that transparency across a wide-area net. Our feeling is that because of the growth of local networks and the need for communications among them, users are trying to solve those problems, and that's what we're focusing on.

What's your attraction to start-up operations?

When I went to DEC in 1969, it was still pretty small, about $100 million in sales. I was impressed with the people who had been there from the early days; and in my opinion, that opportunity had gone by at DEC.

I was looking for that opportunity. Prime had some needs that I had some expertise in, and I was so excited it was a start-up that I joined, although people didn't give it much of a chance at the time.

> You have to show a long-term competitive position in the marketplace now. And you can't compete against DEC.

Have venture capital companies changed their attitudes about funding new ventures?

I think the venture firms realize that the 1980-to-1985 free-for-all [when venture capital funded a huge number of start-ups] is over. What they are looking for now are quality people who have a very solid approach to a marketplace and a good track record.

You have to be able to show a long-term competitive position in the marketplace now. You have to go in with an understanding of your market and your customer. And you can't compete against DEC. It has changed a lot. There are venture firms getting started these days but not nearly as many, and they are more focused now. It's a better environment because there are more requirements set.

How do you feel about the acquisition trend in the industry today?

I think there are good and bad reasons to be acquired. The good reasons are when two companies have synergistic product lines and management teams that can build a better entity — for example, 3Com [Corp.] and Bridge. But I don't think you can solve internal problems through acquisitions. You have to be competitive in the market, understand your customers and build products to answer their needs. Acquiring another company doesn't make those things possible.

If I was in the situation of acquiring a company, I'd make a decision as to whether I was acquiring it for its products or its business. If it were for its business, I would make sure the people who are running the business keep running it. I'd be careful about disrupting the organization because the people have a lot to do with the success of a business.

> The local network industry is going to be very much integrated with the computer industry.

What's Wellfleet's business strategy?

We have a focus on particular market segments. We're at the higher end of the marketplace in terms of interconnecting LANs.

We're dealing with companies that have T-1s and large, facilitywide Ethernet-based systems, including universities and the federal government. They want to use very high-speed wide-area interconnects like T-1 to connect those local networks. Now we have to get those large customers to install our products in order to get a track record.

Do you face heavy start-up costs?

Yes, we do. We're investing heavily on the support side and using specific types of reseller organizations to move our product to end users. We'll also sell through some [third-party] organizations that already have products that are compatible with what we're doing. They're already selling into our potential customer base.

What do you see ahead for the local network industry?

Local networks are becoming integrated into the entire architectures of what companies sell to computer users. DEC, for example, leads the charge. It sells a lot of Ethernet-based systems.

It is, as far as I can see, the largest local network vendor in the world. I think Sun [Microsystems, Inc.] will integrate local networking into its systems architecure. Apollo [Computer Corp.] is doing it, and all the CAD-oriented companies are doing it. IBM will, as well.

The LAN industry is going to be very much integrated with the computer industry, and computer companies are going to be the largest LAN suppliers. The LAN will be the port on the computer.

We feel that the data communications side has a competitive advantage because we're solving problems that are much more difficult to solve, like connecting to T-1 lines. Wellfleet's direct competitors will be 3Com/Bridge, Proteon [Inc.] and Vitalink [Communications Corp.]

Did the 3Com/Bridge merger up the ante for local network vendors?

The independent local network companies will have to find places where they can add value. Clearly, that's been the case on the personal computing local network side.

One of the reasons Bridge did the merger was that computer companies are putting in more and more of the networks themselves. Many companies, such as Bridge and Ungermann-Bass, have done a lot on the broadband side, where they have focused on the facility problem.

As time moves on, we'll see a move toward fiber on the facility side, higher bandwidth and a lot more wide- and local-area network integration. There's been a lot of talk for years about voice/data PBX solutions. In my opinion, the place to mix voice is on the wide-area side; whereas on the local side, if I bring one or two twisted pairs to the office, it doesn't matter. Why make my office building so complex if I don't have to?

But on the wide-area side, I can save lots of money if I can utilize bandwidth most efficiently, and T-1 and ISDN are mechanisms by which you can very cost-effectively mix voice and data.

Might Wellfleet be bought?

At this point, our interest is to build a profitable, long-term business that can dominate a certain segment of the market. If we do that, I think we can remain independent and be successful. We certainly have the right people to build a major data communications company.

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Multiplex will connect IBM personal computers and compatibles to the Sybase DataServer on both Digital Equipment Corp. VAX/VMS and Sun Microsystems, Inc. workstations and servers running Unix.

Multiplex already supports such data bases as Digital Equipment Corp.'s Rdb and Datatrieve, Informix Software, Inc.'s Informix-SQL, Relational Technology, Inc.'s Ingres, Oracle Corp.'s Oracle and Unify Corp.'s Unify.

Ericsson said it recently agreed to sell its copper exchange and fiber-optic cable assets in the U.S. to **Alcatel, N.A., Inc.** for an undisclosed sum. The sale, which is expected to be completed by the end of this year's first calendar quarter, is part of Ericsson's strategy to return to its core businesses in network switching and related areas.

StrataCom, Inc. was recently awarded a contract from Saks Fifth Avenue for the installation of a five-node Integrated Packet Exchange (IPX) private backbone network to connect locations in New York and New Jersey. The T-1 network will provide transmission of integrated voice and data with automatic rerouting capabilities. The value of the agreement was not disclosed.

Digital Microwave Corp. recently established a subsidiary in the UK that will design, manufacture and market microwave and fiber-optic transmission systems for users in that country and other parts of Europe. The company hopes to garner an increasingly larger portion of its annual revenue from sales in European countries, where it has already met with considerable success, officials said.

Separately, the company reported fiscal third-quarter earnings for the period ended Dec. 31, 1987. On revenue of $10.3 million, up from $5.7 million for the similar period last year, the company earned $2 million, as compared to earnings of $1.1 million during the third quarter of fiscal 1986.

Investors reap Lotus data boon

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monthly, McLagan said.

Analysts said sales from Lotus stock quote products are a tiny part of the software giant's total revenue but that the products have good long-term potential.

"Over time," said John Maxwell, senior industry analyst at Dillon, Read & Co., Inc. in New York, "more people will move away from dumb terminals and toward PCs. That is when Signal could blossom."

Quotron Systems, Inc. of Los Angeles, which caters more to financial services firms than to individuals, is the market leader in real-time stock quote products. Lotus claims to be the leader in the individual investor market.

Signal, Quotron's Quotron 1000 and other microcomputer-based products such as Wang Laboratories, Inc.'s Shark market data service are the wave of the future, said Steven B. Frankel, an analyst at Boston-based Adams, Harkness & Hill, Inc.

Lotus sells its stock quote products mostly through retail outlets, such as computer stores. It recently announced a joint venture to market Signal and QuoTrek with The Charles Schwab Corp., a discount brokerage firm.

"Lotus didn't know how to market these products up until now," said Bob Therrien, an analyst at PaineWebber, Inc. "This should be a great help."

QuoTrek originally was marketed in 1983 by San Mateo-based Dataspeed, Inc., which Lotus acquired in July 1985. Development of Signal began at Dataspeed and was completed by LINC.

TELECOM TRENDS

Mexican border firms gain service choice

Qwest, a Dallas-based long-distance service operator, brought its McAllen, Texas, network switching center on-line last week, offering firms in Mexican border cities an alternative to AT&T for digital services.

The carrier hopes to persuade "Maquiladoras," companies located near the border that build products for U.S. markets, to route their interstate voice and data traffic over the Qwest network. The network switch facilities will provide users in McAllen with access to 32 cities in the southern, central and eastern states, as well as the District of Columbia.

INTERNATIONAL LEASED CIRCUITS

Goodyear lauds AM Plus

Tire maker uses AT&T service to order overseas lines.

BY JOSH GONZE
Senior Writer

AT&T received high marks last week from an early user of its international leased-line ordering service called Global Account Management Plus (AM Plus), under which AT&T takes responsibility for red tape on both ends of overseas circuits.

As a participant in the service's 1987 pilot test, The Goodyear Tire & Rubber Co. gained the benefits of consolidated billing, streamlined ordering procedures and lower charges during periods of downtime, according to Royce Zelnar, Goodyear's telecommunications engineer responsible for international communications.

So far, Goodyear has ordered 11 analog circuits from the U.S. to the UK without once having to negotiate with AT&T's counterpart there, British Telecom International, Inc. (BTI), Zelnar said. During the pilot, AT&T could also negotiate on a user's behalf with Kokusai Denshin Denwa Ltd. (KDD) for circuits between the U.S. and Japan, but Goodyear did not take the company up on that offer.

AT&T plans to announce next month an expansion of the service into countries other than the UK and Japan, but the company did not specify which ones.

The main purpose of AM Plus is to coordinate and simplify the process of setting up international leased lines. At the user's option, the service may also be used to consolidate billing for the two carriers involved into a single monthly bill.

According to AT&T, circuits leased through AM Plus cost the same as those leased in the traditional fashion.

Currently, only leased circuits and AT&T's International Skynet service are available through the service. Leased circuits can include voice-only or analog data circuits up to 9.6K bit/sec and AT&T's Dataphone Digital Service circuits up to 56K bit/sec, according to Diane Canaday, international marketing manager at AT&T.

Charges may be calculated in the currency of either nation, at the user's discretion. "You practice a little financial wizardry trying to find which end is going to be the best from an exchange rate standpoint," Goodyear's Zelnar said.

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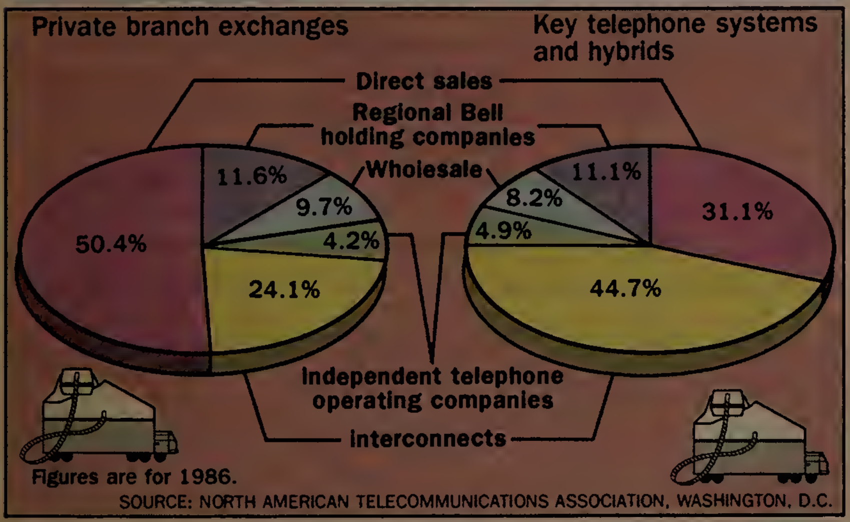
Telephone system shipments



Figures are for 1986.

SOURCE: NORTH AMERICAN TELECOMMUNICATIONS ASSOCIATION, WASHINGTON, D.C.

ISDN CAPABILITIES

Indiana Bell nets university contract

BY JOSH GONZE
Senior Writer

INDIANAPOLIS — Using a customized tariff to undercut bids from PBX vendors, Indiana Bell Telephone Co. recently won an $18 million contract from Indiana University for a Centrex-based voice and data network with ISDN features.

Under the terms of the 10-year contract, Indiana Bell will provide a switching service called Integrated Information Network (IIN) for voice and data in 250 buildings on the university's sprawling campus in Bloomington, Ind. Initially, 18,000 stations will be linked, with growth to 30,000 stations expected during the life of the contract.

According to Arthur Lindeman, director of telecommunications at the university, the Bell operating company's bid won partly because of the Integrated Services Digital Network capabilities offered and partly because of its lower price. The tariffed price was filed as a customer-specific pricing plan that permits Indiana Bell to customize network pricing arrangements.

To take the contract, Indiana Bell beat two premises-based proposals. AT&T offered a network based on a

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CROSS TALK
BOB WALLACE

Centrex sales agent program not a boon for AIM

AIM Telephones, Inc. of Parsippany, N.J. has yet to reap the rich rewards that industry analysts predicted it would after interconnects like itself began selling Centrex for their local telephone companies.

Launched by several Bell operating companies at the North American Telecommunications Association (NATA) conference in November 1986, the Centrex sales agent program was supposed to be an interconnect lifesaver.

Under this program, interconnects would act as Centrex sales agents for the BOCs and would receive a commission for each line of service they sold. The plan looked good for the BOCs, which wanted to boost Centrex sales.

The interconnects, NATA's annual equipment surveys said, were facing reduced profit margins on sales of telecommunications gear ranging from no-frills key telephone systems to large private branch exchanges with all the trimmings. Centrex sales would represent a sorely needed source of revenue for the these vendors.

AIM, one of the East Coast's premier interconnects, joined the Centrex sales agent program in late 1986. Charles Garabedian, a senior vice-president for AIM, said commissions from sales of Centrex service accounted for only 1% of the firm's total revenue in 1987. Although he said he expects revenue garnered from sales of the central office-based service to grow, no large increases are expected.

Sales of Centrex service have helped AIM meet the needs of users looking for a single point of contact for equipment and service. "Selling Centrex has helped us sell station equipment that works with the service," Garabedian said.

Sales of PBXs manufactured by NEC America, Inc. brought in the bulk of AIM's $26 million of revenues in 1986 and most of its $35 million last year. "We recommend Centrex to users and sell them supplemental equipment," Garabedian said. "We were supposed to sell for [the BOCs] as opposed to competing with them."

However, selling Centrex for the BOCs has sometimes pitted AIM against a BOC pitching PBXs. When AIM bids Centrex for a user contract, the BOC often bids a PBX-based package. AIM has also run into situations where it proposed a PBX solution and the BOC pitched Centrex.

The interconnect-BOC relationship has been an awkward one for AIM. "One part of [the BOC] loves us and the other doesn't," Garabedian said. "Although we are an interconnect, we have to be married to the phone company whose region we operate in."

Despite the promise of the sales agent program, AIM has committed its current sales staff to selling key telephone systems, PBXs and voice-messaging systems. AIM realized $2 million in profit in 1986 and an estimated $2.5 million to $3 million in 1987 from the sales of these telecommunications systems.

Commissions AIM receives from the sales of Centrex will likely not represent a major source of revenue for the interconnect in the coming years.

Indiana Bell nets contract

continued from page 13

5ESS central office switch to be located on the campus, and GTE Communications Systems Corp. offered a GTD-5 switch, also to be campus-based. Lindeman said five other proposals had been rejected early in the evaluation process.

The IIN network will be served by a Northern Telecom, Inc. DMS-100 remote switch module that Indiana Bell agreed to install on the university's campus here. The switch module will be linked with fiber to another DMS-100 at a nearby central office.

The contract calls for provision of 50 Basic Rate Interface ISDN circuits, each of which provides two 64K bit/sec channels and a 16K bit/sec signaling channel, and two Primary Rate Interface circuits, each of which provides 23 64K bit/ sec channels and one 64K bit/sec signaling channel. The Basic Rate Interface circuits will run from the DMS-100 on the campus to outlets also on the campus.

Lindeman said the two Primary Rate Interface channels, also extending from the DMS module, may be used to connect a 6,500-line Northern Telecom SL-100 private branch exchange located at the university's Indianapolis campus.

The IIN switching service will replace 4,800 rotary-dial phones now in dormitory rooms with push-button phones.

No specific services are yet envisioned for the ISDN channels. "The main motivation was not so much to obtain ISDN services directly, but to assure ourselves that ISDN services would be there and usable if we decided to use them."

When the request for proposal was distributed, the university expected that a PBX-based proposal would win, Lindeman said.

"I thought that, this time around, we'd end up with a PBX, because we already understood the financial underpinnings and the maintenance and management control issues. We wouldn't have predicted that we would have gone Centrex, given what we had done in the 1985-86 timeframe," when the university bought the SL-100.

"But when the proposals came in, IIN was very competitive with the traditional PBX vendors, and it was a superior proposal."

Indiana Bell, an Ameritech subsidiary, has signed IIN contracts with Inland Steel Co., Cummins Engine Company, Inc., Eli Lilly & Co., USX Corp. and the U.S. Postal Service in the Indianapolis area.

Illinois Bell is the only other Ameritech company currently offering IIN. Its IIN customers include the University of Illinois in Urbana, Deere & Co., Sears, Roebuck and Co.'s Chicago headquarters, Abbott Laboratories, Shared Technologies and Continental-National Assurance Co. ☒

Goodyear lauds AM Plus

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In the past, for Goodyear to lease an international circuit, Zelnar had to order the U.S. portion from AT&T, while a Goodyear employee in the country at the other end of the desired circuit had to order the foreign portion from the other carrier. Then the two carriers had to match the orders and coordinate the technical work involved in setting up the circuit.

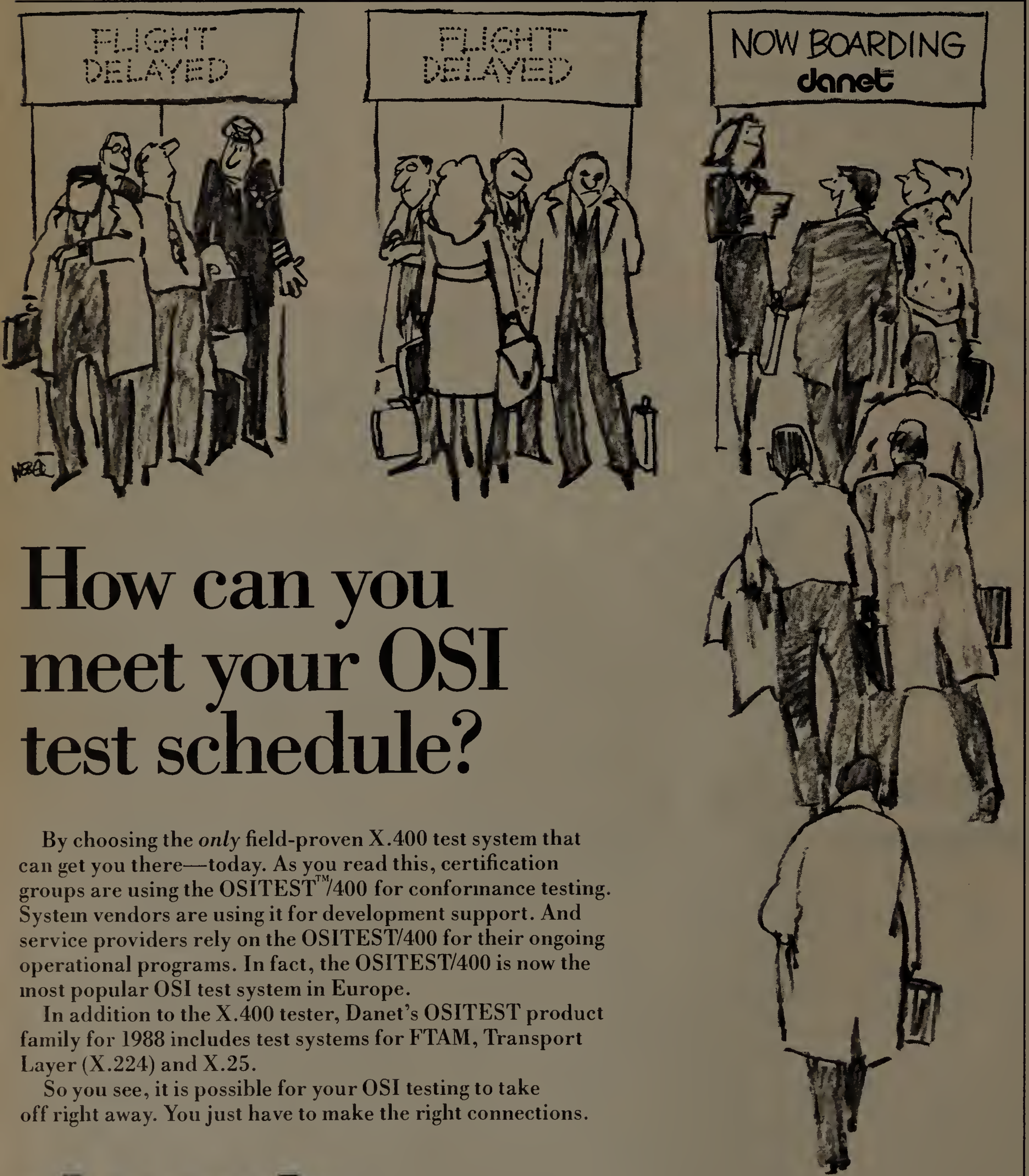
Zelnar said separate billing from two companies for an international circuit leads to budgeting problems because accountants and office managers in the other countries are often late in forwarding the bill to Goodyear's Akron, Ohio, headquarters for payment.

Another major benefit of the AM Plus service, according to Zelnar, is the savings that arise from end-to-end credit given for periods of downtime. Previously, when AT&T's portion of an international circuit went down, only AT&T would credit Goodyear for the outage, even though the entire circuit was unusable. The foreign carrier would continue to charge for its portion of the circuit.

"Now, if a circuit goes out, it doesn't matter whether it's on the AT&T side, or on, say, the BTI side. I do not receive any charge at all," Zelnar said.

Not all users agree, however, that the ordering of international circuits poses serious difficulty, especially circuits to developed countries. BTI and some other Post Telegraph and Telephone administrations have branch offices in New York through which circuits to their countries can be ordered, according to Walter Sing, a technology planner responsible for international communications at First Boston Corp., a large New York bank.

Also, major branch offices in foreign countries of many multinational corporations often have their own communications staff, which is capable of negotiating with those nations' carriers, he said. AM Plus could be most valuable for setting up circuits to countries with smaller branch offices and no dedicated communications manager, Sing said. ☒



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DATA DELIVERY/ NET MANAGEMENT

> “Reports that IBM Token-Ring Network adapters are outselling Ethernet adapters are not accurate. After a few large corporations opted for Token-Ring Networks, everyone overreacted. IBM experienced some success, but even some of its most loyal customers have opted for other LAN alternatives.
>
> **Charles Brown**
> President
> Complete Systems, Inc.
> Herndon, Va.

INTERVIEW

Codex VP tells of plans to provide one-stop shopping

Davies discusses strategy, entry into T-1 mux, X.25 markets.

Mark Davies

Like other communications vendors, Codex Corp. is restructuring its product line to supply customers with one-stop shopping. During the past few years, the company supplemented modem and network management products with a local-area network, X.25 products and two T-1 multiplexers. Mark Davies, vice-president and general manager of wide-area network products at Codex, was responsible for many of these decisions. Recently, Network World *Senior Editor Paul Korzeniowski discussed Codex's strategy with Davies.*

A number of vendors and analysts consider the T-1 multiplexer to be the key component by which vendors can gain account control? Do you agree?

Every vendor examines his strength and says it is the most important element. AT&T said that whoever won the PBX won account control. In theory, the PBX is visible because it is on the customer's premises. So it was likely the vendor would get additional business.

There is substantial opportunity in the T-1 multiplexer market. However, it is not clear to me that a vendor could leverage that success for sales of other products. I can imagine companies installing non-Codex T-1 multiplexers with Codex still winning a substantial part of the customer's communications business.

T-1 multiplexers are important, but the key is network management. A vendor has to be able to integrate all the products so a customer can have a view of how the network is performing. IBM took an intelligent marketing step with the announcement of NetView.

Why do you think network management is the key component?

Customers tell us that management represents the most important issue they face. If they can control devices effectively, they will be able to do their jobs better.

Take a look at the average information system budget. MIS costs represent 40% of the expenditure, carrier equipment represents 45% and communications gear represents the rest. If customers spend a little more for communications, they can reduce both MIS and carrier expenses and realize a net budget reduction. For example, network management may enable a customer to off-load application software from the mainframe. That bottom-line savings is why customers are so interested in network management.

What do users need from a network management system?

NetView is a brilliant marketing strategy and will eventually be a fine system, but many users are looking for independence when managing their networks.

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DATA DIALOGUE
PAUL KORZENIOWSKI

Making SNA a peer-to-peer network is no small feat

The task of migrating IBM's Systems Network Architecture from a hierarchical to a peer-to-peer network model may have been underestimated. During the past few years, IBM worked furiously to add capabilities like LU 6.2 to various software products and PU 2.1 capabilities to different processors. Once these items were in place, customers could build peer-to-peer networks easily.

Such a scenario works in theory. After examining SNA's peer-to-peer capabilities, customers discovered a number of missing pieces. For example, current network management tools do not work well with LU 6.2 applications. They tell a user if a connection is broken or how long it takes a host to process a transaction.

Such information is suitable for a terminal-to-host network, but users need different types of measurements for LU 6.2 applications. For example, they have to measure how much bandwidth an LU 6.2 transaction requires or how often an application transmitted a 3M-byte file. Some of the nation's largest companies are holding back widespread LU 6.2 implementations simply because they do not know how the applications will affect their networks.

SNA routing and naming schemes are also not suited to peer-to-peer networking. VTAM, IBM's host-based communications software, traditionally moved information over an SNA network.

Customers implementing peer-to-peer networks do not want to rely on the host for routing. They want other processors, such as a System/36 or even an IBM Personal System/2 to be capable of moving information.

IBM has yet to tell customers how it plans to address the routing problems. Many analysts expect IBM's Advanced Peer-to-Peer Networking (APPN), which was introduced in June 1986, to play a key role in solving the problems. APPN complements IBM PU 2.1 functions.

For example, PU 2.1 can move information to an adjacent device only. APPN can move data through a network from a starting point to an end

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PROTECTION BOOST

New DEC modems feature security

BY PAUL KORZENIOWSKI
Senior Editor

HUDSON, N.H. — Digital Equipment Corp. recently introduced two modems with sophisticated security features.

DEC's DF212 operates at speeds of 300, 600 or 1,200 bit/sec in asynchronous mode and 600 or 1,200 bit/sec in synchronous mode. The DF242 transmits data asynchronously at speeds of 300, 1,200 or 2,400 bit/sec and synchronously at 1,200 or 2,400 bit/sec.

Both modems offer four levels of security options, from simple password protection to a sophisticated callback feature. With the callback feature, the receiving modem breaks the connection, dials up the transmitting device and reestablishes a connection.

DEC's products have been criticized for not supplying adequate levels of security. Patricia Sluz, product marketing manager at DEC, said, “In the past, modems were thought of only as devices for transmitting data to remote sites and were not deemed security devices.” The modems' on-line error correction and built-in diagnostic features enable a user to monitor each transmission. The devices work with Microcom, Inc.'s Microcom Networking Protocol and Tymnet, McDonnell Douglas Network Systems Co.'s X.PC communications protocols.

The modems support DEC's Modem Command Language and Hayes Microcomputer Products, Inc.'s AT command language. The devices store 30 telephone numbers, each containing up to 36 characters.

The DF212 sells for $645, and the DF242 is priced at $795. Both modems are available now.

Codex VP tells of plans

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Standards enable customers to choose from a variety of options whenever they expand their networks. Any vendor that resists standards is not paying attention to customer needs. We are committed to standards, and we said our new network management system would comply with [Open Systems Interconnect] standards. We also have people working on and chairing various OSI committees.

Does Codex benefit from taking an active role in the standards process?

Certainly, Codex benefits from helping to shape a standard. We can drive our product to meet those standards. Also, we can drive standards in a direction our customers require.

By taking part in the standards process, we are making a statement to customers. Standards enable them to put any vendor's box on their networks, so we will have to compete for every piece of network equipment sold. To make a sale, our products will have to supply higher quality than competitive offerings.

How do you view the T-1 multiplexer market?

In 1984, we decided to become a significant player in the integrated data and voice backbone market. We signed an OEM agreement with Avanti [Communications Corp.], which has a good feeder product. The market has experienced explosive growth and reached sales of more than $250 million last year. We signed a deal last year with StrataCom [Inc.] for a high-end multiplexer. We plan to develop more data and voice products over time because our customers are asking us for nodal processors.

Why did you sign the deal with StrataCom?

We wrestled with that decision for about six months. StrataCom had the vision that fast packet was the technology of the future. We could not quickly develop a product of that nature, and StrataCom had already been working on its product for three years. Time will tell if the product is a big seller. We think StrataCom is on the right track and expect the product to grow in market acceptance in the next few years.

Do you plan to acquire StrataCom?

No, StrataCom believes it has a tiger by the tail. The company thinks it has the right technology and is hitting the market at the right time. StrataCom is confident of its success and would resist acquisition by anyone.

How do you view the X.25 market?

Demand for X.25 products is growing. At first, sales were limited to Europe, but, recently, we've seen U.S. customers migrating from statistical multiplexers to X.25 products. ‘We expect that trend to continue and are trying to determine how to help our customers make those decisions.

How important is the modem market to Codex?

Ten years ago, analysts said the modem market was dead, but we did not believe that. Recently, market researchers said the high-speed market will grow rapidly for the next several years. We continue to develop products so we can remain a leader in the modem business.

Are there any other products you would like to add to Codex's line?

Because we are in the networking business, we always see products our customers need. Network restoral is an important issue because customers want their networks operating 100% of the time. There are two ways to perform that function. First, the vendor could make redundant products. Second, a customer could install spare units and control them by a matrix switch.

We know there are companies that make matrix switches, and we probably would not want to invest the dollars needed to design one ourselves. So, we may OEM such a product.

How many products can Codex sell and support?

Typically, vendors have eyes bigger than their stomachs and want more products than they can handle. We have a vision of a complete system sale, and there are items that complement our offerings. In the next five years, we will expand our line with new hardware, software or service offerings.

Are customers demanding more support from suppliers?

Yes, we understand we are no longer selling simple products like modems or multiplexers. For complex products, we will put a team of people at the customers' sites and make sure they are satisfied with the product, especially a new product.

What sort of changes will Codex have to make to support one-stop shopping?

We must develop facilities management capabilities so we could manage a customer's network. Our long-range strategy calls for us to develop that capability. If called on, we could provide that capability today, but we could not do it on a broad scale.

Do you have any concerns about adding facilities management capabilities to Codex's line?

My biggest concern is quality. If a vendor makes a commitment to becoming a facility manager, it has to make sure that every product on the network meets certain standards.

Large companies like IBM and AT&T are taking on facilities management functions. Can Codex compete with such giants?

We are moving cautiously and cannot provide facilities management functions on a broad scale right now. We could and probably would provide them only to a limited number of customers.

Analysts expect 1988 to be the year of alliances and acquisitions. What do you see in the coming months?

We expect a number of alliances to be signed in the next several months. Discussions are going on across the industry, and there are a number of opportunities we are wrestling with. Some concern acquisitions; others are alliances.

We don't want to engage with a number of partners. A supplier can only work with one or two other vendors at the most because it is expensive to make an alliance work. The two product sets have to complement one another, especially in the area of network management. Vendors have to trust each other, be honest with one another and have complementary business objectives.

Are you looking to make any deals with the regional Bell holding companies?

Any communications vendor has to have those thoughts in mind, and the RBHCs are part of our strategy. I am not prepared to say who we are or should be talking to.

How important is Integrated Services Digital Network to your customers?

Right now, customers want to be assured of a migration path to ISDN. Vendors have to be able to talk about ISDN and must be taking part in ISDN field trials. We view ISDN as a set of interfaces that will become part of our product strategy. We are active in trials and will continue to be. We will deliver ISDN products as the market demands them.

▶ *MODEMS*

High-speed leased-line modem out

New Codex model priced at $3,195.

BY PAUL KORZENIOWSKI
Senior Editor

CANTON, Mass. — Codex Corp. introduced last week a high-speed, leased-line, synchronous modem.

The Codex 2362 supports transmission at speeds from 4.8K to 14.4K bit/sec. When operating at 4.8K, 7.2K and 9.6K bit/sec, the device uses quadrature-amplitude modulation. When transmitting at 12K or 14.4K bit/sec, the modem complies with trellis-coded modulation.

The product can work with an optional four- to six-channel time-division multiplexer. The multiplexer features asynchronous-to-synchronous protocol conversion.

Users can configure the Codex 2362 with a push-button front panel. The product's built-in diagnostic capabilities enable customers to perform loop-back tests and isolate problems on connections.

"Customers are looking to improve response time and reduce costs by moving to higher speed modems, but they do not yet require sophisticated central network management," said Jack Fagan, market planner for the Codex 2362. For example, the new modem is suited to computer-aided design and manufacturing applications, which routinely move large files between processors.

The modem costs $3,195. A four-channel multiplexer costs $3,795, and a six-channel model costs $3,995.

Making SNA a peer-to-peer net

continued from page 15

point.

Right now, APPN is available only on the IBM System/36. Since APPN's introduction, IBM officials have been cryptic about the company's plans for it and have labeled it an experimental protocol.

Until APPN functions are available on other types of processors, SNA will remain, essentially, a hierarchical network.

Another problem is that VTAM lists only certain types of items, like cluster controllers, dubbed physical units, and terminals, called logical units. This type of naming convention works well on mainframe-to-terminal networks. Since intelligent processors are being placed on SNA networks, there is a need to name other items. For example, a user may want to list all the files on a processor. Currently, SNA cannot perform this function. Analysts expect IBM to enhance SNA so it supports a more robust naming convention.

IBM is not the only vendor struggling to enhance its peer-to-peer networking capabilities. Users complain that even Digital Equipment Corp.'s model, DECnet, lacks some necessary features. DEC and other vendors are developing better network management tools, more sophisticated naming conventions and more robust routing schemes.

Evolutionary process

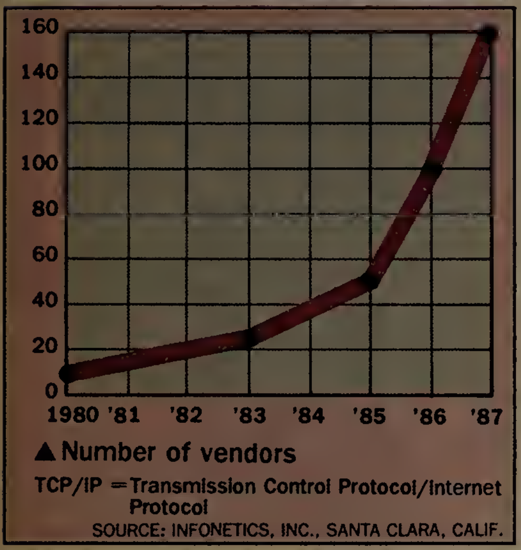
The process of implementing peer-to-peer networks will be evolutionary. Even after vendors address current problems, others will emerge. Shortcomings become evident only after customers experiment with new products and technologies.

Despite all the hoopla, one thing is clear. Right now, SNA cannot easily support peer-to-peer applications — a situation that will probably remain for the next few years.

LOCAL NETWORKING

Excelan to network Unix show

At the UniForum Trade Show to be held at the Dallas Infomart from Feb. 8 through 10, Excelan, Inc. will install an Ethernet-based Transmission Control Protocol/Internet Protocol network linking equipment from about 50 vendors exhibiting at the show. Vendors will communicate using electronic mail, file transfer and virtual terminal-emulation protocols. Sun Microsystems, Inc. will support a distributed file system based on its Network File System protocols.



Dramatic growth of TCP/IP vendors

▲ Number of vendors

TCP/IP = Transmission Control Protocol/Internet Protocol

SOURCE: INFONETICS, INC., SANTA CLARA, CALIF.

MARKET UPDATE

Halley plans internet line

Firm to offer products linking local-, wide-area networks.

BY MARY PETROSKY
Senior Correspondent, West Coast

SAN JOSE, Calif. — Hoping to cash in on users' growing need to link local- and wide-area networks, start-up Halley Systems, Inc. plans to roll out a series of new internetworking products late this quarter.

Halley's internetworking strategy is built on the concept of tying local- and wide-area nets together via a broadband backbone.

Halley does not intend to provide the backbone; rather, its ConnectLAN products will include modems, bridges and routers, as well as network management tools needed to connect local nets with wide-area networks, according to Ed Moura, marketing manager.

Analysts agree there is a growing demand for internetworking products, and new players such as Halley and Wellfleet Communications, Inc. of Bedford, Mass., are emerging to meet that need.

Currently, users have many alternatives for connecting local- and wide-area nets, including use of a T-1 backbone, RS-232 links between Ethernet segments and even use of RS-232 connections to a private branch exchange, said Jack Musgrove, associate director of telecommunications at Dataquest, Inc., a San Jose, Calif., market research firm. As a result, he said, the market is fragmented, with players as diverse as 3Com Corp.'s Bridge Communications division, Vitalink Communications Corp. and Infotron Systems Corp.

> Industry analyst Randall Sherman said he believes Halley's approach is solid. "It's a systems approach; it's smart."

"It's still an area of opportunity for a lot of small companies," Musgrove said. For users, the promise of being able to look at a series of networks in a seamless manner has great appeal, he said.

Unlike most start-ups, Halley has a history and a 5-year-old product line with an installed base. Halley was formed from Zeta Lab's Data Communications Division last May and took with it the Z family of broadband modems.

Halley is now a subsidiary of San Diego-based CCT Corp. Current users of the Z modems include General Motors Corp., The Chase Manhattan Bank, N.A. and the U.S. Defense Intelligence Agency. The company's strategy with its internetworking line is to leverage its installed base and continue to focus on the financial, government and educational sectors.

In Halley's internetworking scheme, the backbone will support devices from multiple vendors, multiple types of media and various protocols. Individual local-area networks as well as wide-area network connections, such as T-1 connections, will be linked to the backbone via a modem, bridge or router.

Each protocol, such as Ethernet or the Token-Ring Network, will be assigned its own channel on the backbone, Moura said.

Among the products to be delivered this quarter is a line of bridges for connecting thin- and thick-cable IEEE 802.3 networks, also known as Ethernet. The basic bridge hardware will be an IBM Personal Computer AT-look-alike that uses an Intel Corp. 80186 microprocessor.

Each bridge will be able to support multiple add-in cards, allowing it to concentrate and switch multiple communications lines, Moura said.

Token-ring, token-bus and Starlan bridges will follow, Moura said.

Software upgrades will allow users to turn bridges into routers, capable of making intelligent routing decisions, Moura said. All of Halley's ConnectLAN products will be based on microprocessors, allowing for intelligent devices that are key to Halley's network management system.

A major component of the ConnectLAN line will be the company's network management system. In its first release, the ConnectLAN/View software will be able to control only Halley's own devices. This graphics-based application will be coupled with a data base and will provide users with a visual representation of the backbone network and the devices on it.

Network administrators will be able to use ConnectLAN/View software to install and configure devices on the backbone network. The management software will also include planning and traffic analysis tools.

Although he said he sees Halley in a niche market, industry analyst Randall Sherman said he believes Halley's approach is solid. "It's a systems approach; it's smart," said Sherman, an analyst with Market Intelligence Research Co. of Mountain View, Calif.

"What created its market was the increasing complexity of network management," said Sherman, who said he sees Halley's strategy as one of simplifying net management. "That's what users want," he added.

LAN SECURITY

Bridge Secure Network Systems family grows

BY MARY PETROSKY
Senior Correspondent, West Coast

MOUNTAIN VIEW, Calif. — Bridge Communications, a division of 3Com Corp., released details last week about a new communications server and three new bridges that are part of its Secure Network Systems family.

All four products provide user authentication, security profiles, access controls, data encryption and audit-trail information. The new products are designed to be used in conjunction with Bridge's secure communications server and network control server introduced last September.

Bridge is aiming its Secure Network Systems line at organizations such as government agencies, banks, insurance firms and law enforcement agencies that maintain data bases with sensitive information.

The Secure PCS/1 Personal Communications Server is designed to provide secure terminal emulation for networked personal computers. It can also accommodate nonsecure or so-called "open" sessions.

The PCS/1 is a board-level product with software for the IBM Personal Computer XT, AT, Personal System/2 Model 30 and compatibles. In addition to establishing a secure session, the PCS/1 offers emulation capabilities, including asynchronous and 3270 terminal emulation. It also provides network services such as access to file and print servers.

The PCS/1 uses the Transmission Control Protocol/Internet Protocol and provides encrypted Telnet terminal-emulation sessions. Emulation software from Bridge or validated third parties runs on top of these sessions, ensuring security of the personal computer-to-host connection and permitting secure asynchronous file transfer. On the host side, Bridge's previously announced secure communications server performs decryption.

Bridge's network control server, also previously announced, performs the key distribution and certification functions.

The PCS/1 is available in three versions: Ethernet and Bridge 5M bit/sec broadband versions, priced at $1,795; and a thin Ethernet version, which costs $1,895.

The secure bridges are designed to protect information as it moves between local networks on a backbone network or other communications links used for internetworking. The three models are: the Secure IB/1, which links IEEE 802.3 Ethernet networks with Bridge 5M bit/sec broadband networks; the Secure IB/2, which interconnects two Ethernet networks; and the Secure IB/3, which connects remote Ethernets over T-1, RS-232, RS-422 and V.35 links. Data transmitted between Secure IB models is encrypted.

The Secure IB bridges operate at the data link layer and are protocol-independent. As a result, data transmitted between networks can be in any higher level protocol, such as TCP/IP, Xerox Corp.'s Xerox Network Systems or Digital Equipment Corp.'s DECnet.

Pricing for the Secure IB bridges starts at $12,000.

Upgrades for Bridge's nonsecure IB units will be available in the second quarter.

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Like the Rolling Stones

According to a survey conducted recently by *Personnel Journal*, job satisfaction is the No. 1 worker concern. Thirty-six percent of the workers surveyed by the publication listed job satisfaction as their leading concern, compared with the 18% who cited job security. Making more money ranked third, with 17% of workers listing it as their chief concern.

▶ *HIRING PRACTICES*

Industry recruiters seek Renaissance people

Technical, managerial skills make unbeatable combo.

BY MICHAEL FAHEY
Senior Writer

“Everybody is looking for the non-nerd technical guy — the Renaissance man with technical and management skills,” said Ty Smith, president of Smith-Nichols Recruitment and Search, Inc., in Norcross, Ga.

Those paragons of the communications world, though rare, do exist. For recruiters such as Smith, finding communications personnel with technical and management skills can mean lucrative fees from user companies.

Experienced people familiar with network design and planning command between $58,000 and $65,000 a year, according to Roger O'Connor, a staff consultant for Edward Perlin Associates, Inc., a New York-based compensation management firm.

Throw in strong management skills, and the price tag goes up. “A top telecommunications planning person with good management skills, someone at the director level, can make from $85,000 to $100,000,” O'Connor said.

What those salary figures don't include is roughly $35,000 in hiring overhead, including the cost of clerical, interview, training and start-up time that a user incurs in bringing a key worker on board, O'Connor said.

One way of finding network personnel with a mix of technical and management skills is to use what Smith called the referral recruitment technique. This involves calling people who fit the profile of the worker a company is seeking. The job, salary and other benefits are described, and the people are asked if they know of any likely candidates for the position.

While the technique often produces some suggested candidates, it is also a reasonably subtle way of presenting the job to the person on the other end of the line.

See page 20

GUIDELINES
RICK MARGOLIS

Delegate work, share success

Effective delegation allows managers to work through others in order to accomplish more. But if it's obvious that delegation is a process temporarily freeing up one person while obligating another, it's less obvious why so many managers are such awful delegators.

Why do some managers always seem inundated by responsibilities and others appear to have nary a thing to do? Much of the widespread inefficiency in delegating may be traced to a lack of understanding about what delegation is and the strategy necessary to delegate effectively.

Delegation means assigning a project, activity or task, for which you are accountable, to another person. When delegating, a manager gives up some responsibility while retaining full accountability. A manager needs to be able to be “irresponsible” and accomplish exemplary results.

The first step in assigning a project is to define clearly what is being delegated. That way, managers can avoid the migraines and misunderstandings that often result when others are called on to help out.

In turn, subordinates are spared the anxiety and confusion that accompany ambiguous assignments. When defining a project, managers need to specify the desired results, the time period in which the work is to be completed, any applicable budgetary considerations and the resources available to accomplish the task. Resources include authority as well as manpower and materials. Managers should also be prepared to discuss the importance of the project to the organization.

After establishing a clear framework for the project, managers need to select the right person for the task. Disappointing or inadequate outcomes often result from managers inappropriately or hastily assigning tasks. Choose an individual who, by virtue of prior experience or talents, is likely to achieve the desired outcome.

After selecting the person, explain the task. Then ask the person to restate the assignment. This encourages the transfer of commitment from the manager to the subordinate and allows the delegator to check the individual's understanding of the assignment.

When you are sure the subordinate understands what is expected, ask how the person intends to accomplish it.

Plans may be either verbal or written, depending on the nature of the task. If the initial plan will not work or is far from being an optimal strategy, discuss the difficulties in a tactful manner and ask for and suggest some alternatives. The delegator and the subordinate must always agree on the plan and the course of action prior to

See page 20

Margolis is director of program development for MAGE Centers for Management Development, a management consulting firm in Boston, Montreal and Toronto.

Telecom supervisors' salaries and bonuses

Region	Salary	Bonus
Northeast	$41,900	$1,900
Southeast	$48,900	$3,600
Midwest	$36,100	$2,000
Southwest	$35,300	$1,800
California and Hawaii	$44,300	

Average figures listed by region and based on a 1987 salary survey. Bonus information for California and Hawaii was unavailable.

SOURCE: ASSOCIATION OF DATA PROCESSING SERVICES ORGANIZATION, ARLINGTON, VA.

DIALOGUE

Has the continued uncertainty in the stock market and U.S. economy affected your company's 1988 network spending plans?

“No, it hasn't affected our plans. You have to look at the situation practically. Networking and communications in general cost a lot, but they gradually will reduce overall corporate expenditures.

Robert Larkin
Manager of information systems
Jones Group, Inc.
Charlotte, N.C.

“We're making up our budget now, and there has been no impact as far as I'm concerned. We're very careful about spending anyway. Our T-1 network that we began installing about two years ago is almost in place. We might make a few adjustments to that, but we don't have any big projects coming up.

George Reiswig
Director of MIS
Perdue Farms, Inc.
Salisbury, Md.

“The stock market hasn't affected our plans at all. That doesn't mean that, if it continues along the same path, we will not adjust. But there is no indication that will happen. Besides, we are involved in a continuing plan to redesign our voice and data communications network, and it's hard to stop in the middle.

Peter Price
Senior vice-president
and director of MIS
Great Lakes Bancorp.
Ann Arbor, Mich.

“No, not at all. It doesn't seem to have affected the marketplace as far as people buying our products. In fact, our budget has somewhat increased.

Jim Witkowski
Director of information systems
Price Pfister, Inc.
Pacoma, Calif.

“No. So far in 1988, I have had everything approved, including the staff increase I've wanted for the past two years. Our schedule is going to go forward as planned.

David Headley
Manager of communications
Tiffany & Co.
Parsippany, N.J.

See **Dialogue** page 20

Recruiters seek Renaissance

continued from page 19

In addition, many companies have instituted employee referral programs to attract technical staff, according to O'Connor. Employees who identify successful job candidates are given sizable bonuses.

Smith said one source of personnel with technical and management experience, particularly for less senior positions, is the military. Smith is a former test pilot.

"Former junior officers make great employees," he said. "They have a can-do attitude, great leadership qualities and are often very well trained in technical areas."

In addition, Smith said, ex-military personnel often come cheaper than their civilian counterparts. Advertising in publications such as the *Army Times* and the *Air Force Times* are good ways to reach military personnel preparing to return to civilian life, he said.

"In evaluating job candidates, employers should look for a track record of success. What made people successful in the past will make them successful in the future," Smith said. "They should look for honors and achievements that prove leadership and management skills. Was the candidate president of the technical fraternity or student body? Or was he captain of a sports team or the debate team?"

But even after identifying technical people with management skills, many companies often bungle the hiring process, said Norm Oppenheim, president of Fortune Communications Group, a Nashua, N.H.-based recruitment company.

One reason, he said, is because companies become more concerned with the hiring process than with its end result.

"They do a first round and a second and third round of interviews," Oppenheim said. "They do it all in rounds and get caught up in the process of interviewing, as opposed to finding the person they are looking for and going about bringing that person on board."

Oppenheim said it is not uncommon for businesses to get so caught up in the hiring process that it takes them six months to fill a key communications position.

"When it is done right, the hiring process is conducted by decisive managers who know what they are looking for," Oppenheim said. "When they see the right person, they take him through the process in a way that builds loyalty and commitment."

Lewis Haring, vice-president of network planning at The Chase Manhattan Bank, N.A. in New York, said qualified people, especially those with strong management experience, are so hard to come by that he will short-circuit the usual hiring process to land them. "If I come across someone who is a highly qualified candidate, I'll put them on the fast track for hiring," he said.

Many companies offer "sign-on bonuses" separate from relocation expenses, Oppenheim said. "It is an incentive, and compensation for the travail of making the change and to make up for any retirement funds a person might lose by switching companies."

Thanks, ICA members, for making Network World your best-read communications-oriented publication.

NETWORK WORLD
Gary J. Beach
Publisher

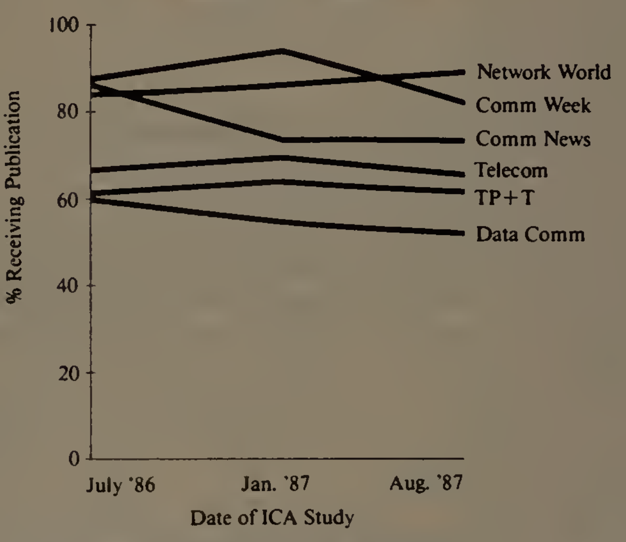
"Rome wasn't built in a day." Although you've heard this saying time and time again, the philosophy behind it — that through hard work you can make things better day by day, week by week, and year by year — remains sound.

It's this very philosophy that *Network World* editors have followed during the past 18 months. And in doing so, they have remained true to their initial goal: to make each issue of *Network World* the best possible for you, our readers.

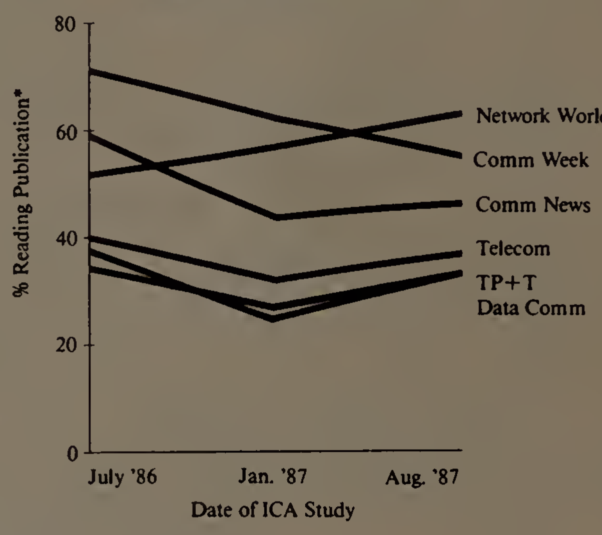
Evidence is growing that *Network World's* long-term commitment to editorial excellence is paying off. In fact, the latest study conducted by an independent research firm among ICA members shows rather impressive results. Not only does *Network World* top the list of communications-oriented publications in receivership, but it now ranks number one in readership as well.

As you can see in the following charts, both receivership and readership of *Network World* among ICA members have steadily increased since July 1986. However, during this time period, these same ratings have declined for almost every other communications-oriented publication.

Total Receivership of Communications-oriented Publications among ICA Members



Total Regular Readership of Communications-oriented Publications among ICA Members



* Readership figure for each publication is based on the number of ICA members who receive that publication.
Studies conducted by First Market Research of Boston.

There's no question about it. *Network World's* in-depth networking coverage is what enables us to deliver a unique editorial product that progressive communications users have come to rely on week after week.

Thanks to the growing support of ICA members and continued dedication of all our readers, *Network World* is now the number one communications-oriented publication for today's leading-edge users.

Cordially,

Gary J. Beach

Gary J. Beach
Publisher

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An IDG Communications Publication

Delegate work, share success

continued from page 19

beginning the assignment.

Even after selecting the right person, it is important to schedule progress checkpoints and to express confidence in the worker's ability to accomplish the task competently.

Progress checkpoints reduce the possibility of unanticipated surprises occurring.

Progress checkpoints are intended to audit achievement without undermining individual initiative. They are not aids for managerial backseat driving; some managers need to learn to keep their hands off the wheel.

When the delegated task has been successfully completed, make sure your associates receive the appropriate recognition and credit. Also, recruiting individuals for the next project will be significantly easier. People tend to remember success. Effective delegation makes everyone involved successful.

Dialogue from page 19

“We're going ahead with what we decided in September when we put our operating plan together. Our budget is about the same as it was last year. We don't have any extensive networking projects coming up this year.

Richard A. Seipel
Vice-president of corporate information management
Bausch & Lomb, Inc.
Rochester, N.Y.

“We haven't seen any effect at this point. We have been fairly conservative. We made up our budget in October, and it was approved after the crash. I assume we'll stick to it.

Michael Specht
Director of telecommunications
Sterling Drug, Inc.
New York

NEW PRODUCTS AND SERVICES

See inside for:

▶Racore Token-Ring Network hub

▶FTP's net analyzer software

▶Anderson Jacobson modem cards

▶ *VIDEOCONFERENCING*

PictureTel compression ware to bow

BY JIM BROWN
New Products Editor

PEABODY, Mass. — PictureTel Corp. is expected to introduce a proprietary video-compression technology this week for its two-way videoconferencing system.

The firm's new Hierarchical Vector Quantization (HVQ) compression technique is said to improve the video quality of PictureTel's videoconference system by 70%, compared with the company's current Motion Compensated Transform (MCT) coding.

Both compression techniques are cartridge-based modules that plug into PictureTel's video coder/decoder. The coder/decoder digitizes incoming video images and audio.

An algorithm in the coder/decoder compresses those digitized signals for transmission via digital lines operating at 56K bit/sec, including AT&T's Accunet Switched 56 service.

If left uncompressed, those images and signals would require a 90M bit/sec digital line.

Although HVQ does not compress more bits onto the line, it improves on the image quality of MCT by adjusting the resolution of a digitized picture as movements are detected.

As motion speeds up, HVQ further decreases the resolution of those parts of the image that are moving.

With MCT, the picture degrades into a series of visible image blocks in response to quick motions. MCT breaks the screen into a series of block-shaped regions. Digitized information representing parts of a picture that do not change from one frame to the next — a wall, for example — are transmitted only once.

When there is a change in the composition of the picture, the receiving coder/decoder is instructed to reconstruct the blocks to reflect those movements. When movements are sudden or fast, MCT results in the received picture being separated into a series of visible blocks.

Although compression makes a picture acceptable over 56K bit/sec, PictureTel recommends the picture be sent at 112K bit/sec.

PictureTel will demonstrate the new technology at the Communication Networks '88 conference and exhibition starting in Washington, D.C. next week.

The new HVQ software will be available in March. Current PictureTel customers will receive an HVQ cartridge free of charge.

PictureTel is located at One International Way, Peabody, Mass. 01960, or call (617) 535-7700.

▶ *SATELLITE NETWORKS*

NEC to introduce VSATs with T-1 capabilities

New units slated for display at ComNet conference.

BY JIM BROWN
New Products Editor

HERNDON, Va. — NEC America, Inc.'s Radio & Transmission Systems Group is expected this week to introduce a pair of VSAT satellite earth stations capable of supporting 1.544M bit/sec T-1 speeds and the 2.048M bit/sec European equivalent.

The Enhanced Nextar Clear Channel Indoor Unit and the Nextar CL TSAT very small aperture terminals consist of an antenna, an NEC radio-frequency radio, cabling and a modem. They enable users to transmit digital data, voice and video and to support point-to-point or multipoint networks.

The units support IBM's Systems Network Architecture/Synchronous Data Link Control data format.

The Enhanced Nextar Clear Channel Indoor Unit supports speeds from 9.6K bit/sec to 2.048M bit/sec.

The Nextar CL TSAT can support either the U.S. T-1 rate of 1.544M bit/sec or the European equivalent of 2.048M bit/sec.

The new units will be on display at the Communication Networks '88 conference and exhibition, which will be held next week in Washington, D.C.

The Indoor Unit supports user-selectable modulation formats, binary phase shift key for rates between 9.6K bit/sec and 48K bit/sec, and quadrature phase shift key (QPSK) for rates of 56K bit/sec to 2.048M bit/sec. It uses an antenna that ranges in size from 1.2 to 4.5 meters

The Nextar CL TSAT uses a QPSK modulation technique and an antenna that ranges in size from 2.4 to 3.6 meters.

The Indoor Unit supports RS-232-C, RS-449/423, RS-422/449, V.35 and DS1.

The Nextar CL TSAT supports RS-422/449, V.35, DS1 and the Conference of European Postal and Telecommunications T-1 equivalent interfaces.

Both VSATs are capable of broadcasting in the 11.7 GHz-to-12.2 GHz and 14 GHz-to-14.5 GHz frequency ranges, and both of them support a single-channel-per-carrier satellite access method.

The VSATs are controlled via an NEC Remote Monitor and Control system. That IBM Personal Computer-based system links to the VSAT modems via an RS-232-C port that supports asynchronous data at 1,200 bit/sec.

With the Remote Monitor and Control system, a network administrator is able to turn the VSATs on or off and set such configuration options as data rate, modulation technique and radio power settings.

The administrator is also able to monitor the VSATs' operations and receive any alarms.

Pricing

The new products are supplied in systems that contain a 3.6-meter antenna, a three-watt RF radio and cabling. A system using the Nextar CL TSAT modem is $30,000, while a system that uses the Enhanced Nextar Clear Channel Indoor Unit modem ranges in price from $8,000 to $40,000.

NEC America's Radio & Transmission Systems Group is located at 14040 Park Center Road, Herndon, Va. 22071, or call (703) 834-4000.

▶ *COMMUNICATION NETWORKS '88*

Tellabs, Unidata wares to bow

Hybrid net control, voice-mail systems to debut.

WASHINGTON, D.C — A network management system for Tellabs, Inc. equipment and a microcomputer-based voice-messaging system from Unidata Corp. are expected to be introduced at the Communication Networks '88 conference and exhibition starting here next week.

Lisle, Ill.-based Tellabs is expected to use the show to introduce a network management and control system for hybrid voice/data networks.

The Tellabs Network Management System is designed for networks using Tellabs 53X T-Carrier Cross-Connect Systems. Included in that product line are the firm's Crossnet T-1 multiplexers and nodal switches, 331 Xplexer packet switches, 330 Dataplexer statistical multiplexers, digital echo canceller systems and adaptive differential pulse code modulation transcoders.

The firm's Network Management System enables administrators to reconfigure Tellabs equipment in the network and to learn when customer-defined parameters have been exceeded.

Users looking for a low-end voice-messaging system can expect Paramus, N.J.-based Unidata to introduce an IBM Personal Computer-based voice mail system. Mega Voice consists of an add-on board and software that will digitize incoming voice messages at 2,400 bit/sec. The system enables Personal Computers with a 20M byte hard disk to store up to 18 hours of voice messages.

With Mega Voice, users plug their telephones into the RJ-11 jack of the Mega Voice Personal Computer card. Calls are then stored on the Personal Computer's hard disk. Users are also able to forward voice messages to similarly equipped remote Personal Computers via asynchronous dial-up modems.

First Look

Racore announces Token-Ring Network hub

Racore Computer Products, Inc. introduced an eight-port hub that links IBM Personal Computers to an IBM Token-Ring Network.

The company's **Multistation Access Unit (MAU)** supports Personal Computers equipped with Token-Ring adapter cards. Those Personal Computers can be up to 330 feet from the MAU. The MAU enables attached Personal Computers to communicate with each other and also lets Personal Computers attached to one MAU communicate with those attached to another.

A string of MAUs can be daisy-chained together to support a Token-Ring Network of up to 260 Personal Computers. Each MAU can be located up to 148 feet apart.

Racore's MAU costs $395, about half the price of a similar IBM unit, according to Racore.

Racore Computer Products, Inc., 170 Knowles Drive, Los Gatos, Calif. 95030, or call (408) 374-8290.

FTP Software releases new net analyzer software

FTP Software, Inc. unveiled a new version of its IBM Personal Computer-based network analyzer software.

LANWatch Version 1.1 enables users to analyze Ethernet data packets supporting Digital Equipment Corp.'s DECnet, Xerox Corp.'s Xerox Network Systems and Novell, Inc. network protocols. The package also adds support for analyzing data packets on Proteon, Inc.'s ProNET-10 token-ring network. The new version of the software will work with network interface boards made by BICC Data Networks, Excelan, Inc., Micom-Interlan, Inc., Proteon, Western Digital Corp. and 3Com Corp.

The previous version analyzed only Ethernet data packets supporting the Transmission Control Protocol/Internet Protocol.

The software is designed to capture mirror images of data packets from a local-area network and store them in a Personal Computer buffer. The package will display information about those packets on the screen in real time. Users are also able to store those packets on a disk. The software enables users to examine the contents of each individual data packet, including the complete header field and the data in that packet.

LANWatch Version 1.1 sells for $1,200.

FTP Software, Inc., P.O. Box 150, Kendall Square Branch, Boston, Mass. 02142, or call (617) 868-4878.

Anderson Jacobson offers 2,400 bit/sec modem cards

Anderson Jacobson, Inc. announced three 2,400 bit/sec dial-up modem cards capable of operating synchronously or asynchronously.

The modems, the **AJ 2441-2, AJ 2441-2M** and **AJ 2441-2C1,** are used in the firm's Modular Modem System. They are compatible with CCITT V.22 and V.22bis recommendations as well as Bell 103 and 212 modem standards.

The modems are also compatible with the Hayes Microcomputer Products, Inc. AT command set and support such communications software packages as Communications Research Group's BLAST and Crosstalk XVI, made by Crosstalk Communications/DCA, a subsidiary of Digital Communications Associates, Inc.

The new modems support autodialing capabilities can store 10 telephone numbers in nonvolatile memory. They also support a dial-back security scheme. That security scheme requires modems dialing into a central site to furnish a password code and hang up. The central site modem will match that code with the telephone number of the remote modem and automatically dial that number.

The AJ 2441-2M modem supports Microcom, Inc.'s Microcom Network Protocol (MNP) Level 4 error-checking scheme, while the AJ 2441-2C1 supports MNP Level 5.

Anderson Jacobson also sells plug-in modules that enable users to add MNP to the AJ 2442-2.

Up to 16 of the new modems can reside in a single AJ UCCA-01 card cage or AJ UCSA-01 stand-alone enclosure.

The AJ 2441-2 costs $495, with quantity discounts available. The AJ 2441-2M costs $695, and the AJ 2441-2C1 costs $995.

Anderson Jacobson, Inc., 521 Charcot Ave., San Jose, Calif. 95131, or call (408) 435-8520.

MacroTel introduces new telephone systems

MacroTel International Corp. introduced a hybrid key telephone system capable of supporting 32 or 64 ports and a pair of key telephone systems.

The **MT-SBX** hybrid key system, to be available in the second quar-

What our retail clients will tell you about N.E.T. T1 networks:

ter, will provide pooled access to outside trunks. The product will allow users to access trunks by dialing 9 or a pooled-access button, rather than selecting a particular trunk, as with conventional key systems. Each system port supports eight lines or trunks.

The MT-SBX will support eight- or 16-line executive display telephones as well as eight- or 16-line nondisplay telephones. A 32-character alphanumeric display on the executive telephone will support text messaging. Also, the product will offer off-hook call announce, voice mail and cost-accounting features.

The **MT-308** key system will support three lines and eight telephones, and the **MT-816** key system will support eight lines and 16 telephones. Both key systems will support either three- or eight-line telephones. Aimed at small users, the key systems will support fully programmable telephone function keys, direct station select, busy lamp field, speakerphone, single-button redial, automatic queuing and camp-on busy.

The MT-SBX hybrid will carry an installed price of about $400 per station, which is similar to the company's MT-Series A product. The two key systems will be available at an installed price of about $300 per station.

MacroTel International Corp., 3540 N.W. 56th St., Fort Lauderdale, Fla. 33309, or call (305) 484-4000.

Port expansion board for Banyan file servers bows

Banyan Systems, Inc. unveiled an expansion board that adds serial communications ports to its local-area network file servers.

The six-port **Intelligent Communications Adapter** board works with IBM Personal Computer AT-compatible and Intel Corp. 80386-based Compaq Computer Corp. Deskpro microcomputers configured as file servers. Those microcomputers must be running Banyan's VINES/286 or VINES/386 virtual network operating system software.

The ports support server-to-server, server-to-host and server-to-remote IBM Personal Computer communications.

Two of the board's ports are capable of supporting channel-controlled direct memory access to the server at speeds up to 64K bit/sec, and four ports support lines that run at 19.2K bit/sec.

The board uses an 8-MHz Intel 80286 processor with 512K bytes of random-access memory. It supports the 16-bit bus architecture of the Banyan/CNS server and can also be used with the Banyan/BNS and Banyan/DTS servers, which support 8-bit bus architectures.

The Intelligent Communications Adapter board costs $1,495 and will be available in March.

Banyan Systems, Inc., 115 Flanders Road, Westborough, Mass. 01581, or call (617) 898-1000.

Murata autodial facsimile stores 64 phone numbers

Murata Business Systems introduced an autodial facsimile machine capable of storing up to 64 35-digit telephone numbers.

The **F-30** is also capable of supporting up to 40 speed-dial numbers and 24 one-touch commands. The unit will automatically redial busy numbers until the call is answered by the remote facsimile.

The F-30 also features a 16-digit LCD display that keeps operators informed of call progress and other operational details. Users can program the unit to display call progress and other information in either English or Spanish.

The F-30's delayed-dialing function lets users benefit from lower nighttime telephone rates by programming the unit to transmit documents unattended. The machine can also dial a central-site Murata ImageMaster facsimile and download files stored on ImageMaster.

The F-30 costs $2,495.

Murata Business Systems, 4801 Spring Valley Road, Dallas, Texas 75244, or call (214) 392-1622.

Video storage and transmission systems bow

Colorado Video, Inc. recently expanded its line of freeze-frame video teleconferencing products.

The **Model 951 Digital Image Communications System** enables an IBM Personal System/2 Model 30 with an internal 9.6K bit/sec modem, a 20M-byte hard disk and a Colorado Video Model 941 Video Frame Store unit to transmit video images. With the system, users can store as many as 80 full-frame video images on disk. Users are also able to tilt images on the microcomputer screen or add information to the image before it is transmitted to the remote site.

The **Model 491 Video Frame Store** consists of an IBM Personal System/2 Model 30 with a 20M-byte hard disk. This product works with Colorado Video's digital Model 286 and analog Model 290 freeze-frame transceivers.

The price of Model 951 starts at $10,500. The Model 941 price starts at $6,000.

Colorado Video, Inc., Box 928, Boulder, Colo. 80306, or call (303) 530-9580.

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NETWORK STANDARDS

JAMES HERMAN

The private life of ISDN

The Integrated Services Digital Network is generally described as representing a major upgrade to the capabilities and services of public networks. Certainly, its impetus has come from telephone companies and Post, Telegraph and Telephone administrations around the world, as well as from manufacturers of central office telephone switching equipment. The regional Bell holding companies hope ISDN will revive Centrex, and, along with long-distance providers, they see it as a way to stem the private networking tide.

But ISDN is a set of interfaces and services that is potentially applicable to any digital network, even a private one. If ISDN works and makes sense, it will become a standard building block for constructing private local- and wide-area networks. ISDN standards, in this sense, are very much like their predecessor, X.25. The X.25 standard was driven by public network providers in Europe, Canada and the U.S. Yet today, its use as a private network standard is as important as its presence in the public sector.

ISDN will most likely make its way into private networks at the local level first, as an enhancement to digital private branch exchanges. Major PBX vendors are developing ISDN capabilities for their products. The recently announced 9750 series from IBM is clearly designed in anticipation of the formats and speeds of ISDN. AT&T has announced availability of the ISDN Primary Rate Interface (23B+D) for the System 85 and is promising the Basic Rate Interface (2B+D) in 1989. Northern Telecom, Inc. is focusing on using these capabilities for networking PBXs and delivering voice and data functionality independently of public networks.

In a private network based on PBXs, user telephones and personal computers — as well as integrated voice/data workstations — will connect to a local PBX using the Basic Rate Interface over standard building twisted-pair wiring. Mid-sized computers, such as departmental processors, can also be connected using the Basic Rate. Larger computers could use the Primary Rate for higher throughput. It will also be possible, however, for computers of any size to use an existing X.25 connection to the PBX, since ISDN standards allow for connection to X.25 services.

For multisite networking, PBXs can be connected over direct T-1 circuits and employ the Primary Rate protocols for PBX-to-PBX signaling and circuit establishment. The U.S. standards committees are beginning to draft standards that allow for this kind of bypass of public ISDN facilities. In this role, the PBXs usurp the roles of private X.25 packet switches and T-1 multiplexers, offering the same services as well as expanded capabilities for transparent dynamic circuit switching.

The X.25 and T-1 switch vendors will certainly react to such a development by enhancing their products with ISDN capabilities. Primary Rate Interfaces will surely appear on T-1 switching and multiplexing products. Timeplex recently announced its intention to add a Primary Rate Interface to its T-1 product line.

Advanced switching architectures are clearly headed toward the integration of packet- and circuit-switching services in a single box. ISDN is a logical interface for this new breed of switches, since it offers a completely flexible means of selecting type of service by channel.

What is perhaps most important about ISDN is that it provides a means for user devices to make this selection, something not possible with any current interface standards. In this scenario, the T-1 backbone switches migrate toward the Primary Rate Interface and assume the additional functionality of today's X.25 packet switches.

Although it may seem farfetched today, by the early 1990s large organizations will likely be migrating their private networks to ISDN interface standards. With well-entrenched T-1 backbone networks as a solid foundation, they will be well-positioned to benefit from the features and flexibility of ISDN without waiting for the public networks to be upgraded. For them, a private ISDN can be a strategic response to patchy and possibly incompatible implementations of ISDN by the BOCs and long-distance carriers.

Of course, all this presumes that ISDN works and proves its worth as a technology and a standard. If ISDN isn't able to deliver significant new capabilities and cost advantages, then it won't make it as a private network architecture. However, in that case, it also won't make it as a public network service.

Herman writes, teaches and consults on telecommunications technology in Cambridge, Mass.

COMMUNICATIONS CHARGEBACKS

DEAN J. WOLF

Paying the piper

Just as residential telephone users must pay for home telephone services, corporate data network users are being asked to pay for communications services provided to them by their companies.

Unlike the regulated public switched network, corporations have no standard approach for allocating corporate data network costs to users. Nevertheless, corporate telecommunications managers are frequently charged with developing a system to accomplish three goals:

- To provide a means of recovering network construction and maintenance costs.
- To allocate costs based on the network resources consumed.
- To help users accurately judge which types of communications services they need.

A usage-based data network chargeback scheme determines the end user's communications bill by tracking the amount of data transmitted during the billing period. However, this isn't the best means for allocating network costs.

A better approach is the connection-oriented scheme favored by the telephone companies, in which users are billed for the telephone line and for the number and duration of calls they make. Users are billed not just for what they say but for how long it takes them to say it.

To achieve the goals noted above, communications chargeback systems should be based on the actual cost of network components. But simply measuring the number of characters or packets transmitted doesn't bear an adequate relationship to these costs.

For example, a user performing batch file transfer operations may transmit more characters during a period than one that executes interactive terminal functions; however, the networking resources used by each may be identical.

If both users are connected to dedicated circuits running at the same speed, the connection for each user requires a circuit, a pair of modems and a dedicated front-end processor or concentrator port. In an environment in which the chargeback scheme is based on transferred characters, the batch user pays more for the use of identical network facilities.

Usage-based data network chargeback systems take into account not only the amount of data transferred but also the manner in which the network is used. A connection-oriented chargeback system that's based on the actual communications facilities installed doesn't impose these penalties on users. Rather, users pay for only the actual resources required to connect them to the network.

A connection-oriented chargeback system uses the access port as its primary unit of measurement. The total cost of the network backbone is divided by the number of access ports. The rate for an individual port is adjusted based on the speed of the connected circuit so that higher speed lines are charged at a higher rate because they use more processor resources.

Dial network access charges are determined by connect time — the

Wolf is a consultant with Network Strategies, Inc., a communications consulting firm in Fairfax, Va.

Get on your soapbox. Proselytize by penning a guest column for *Network World*'s Opinions Pages. Columns should express strong opinions on timely industry issues.

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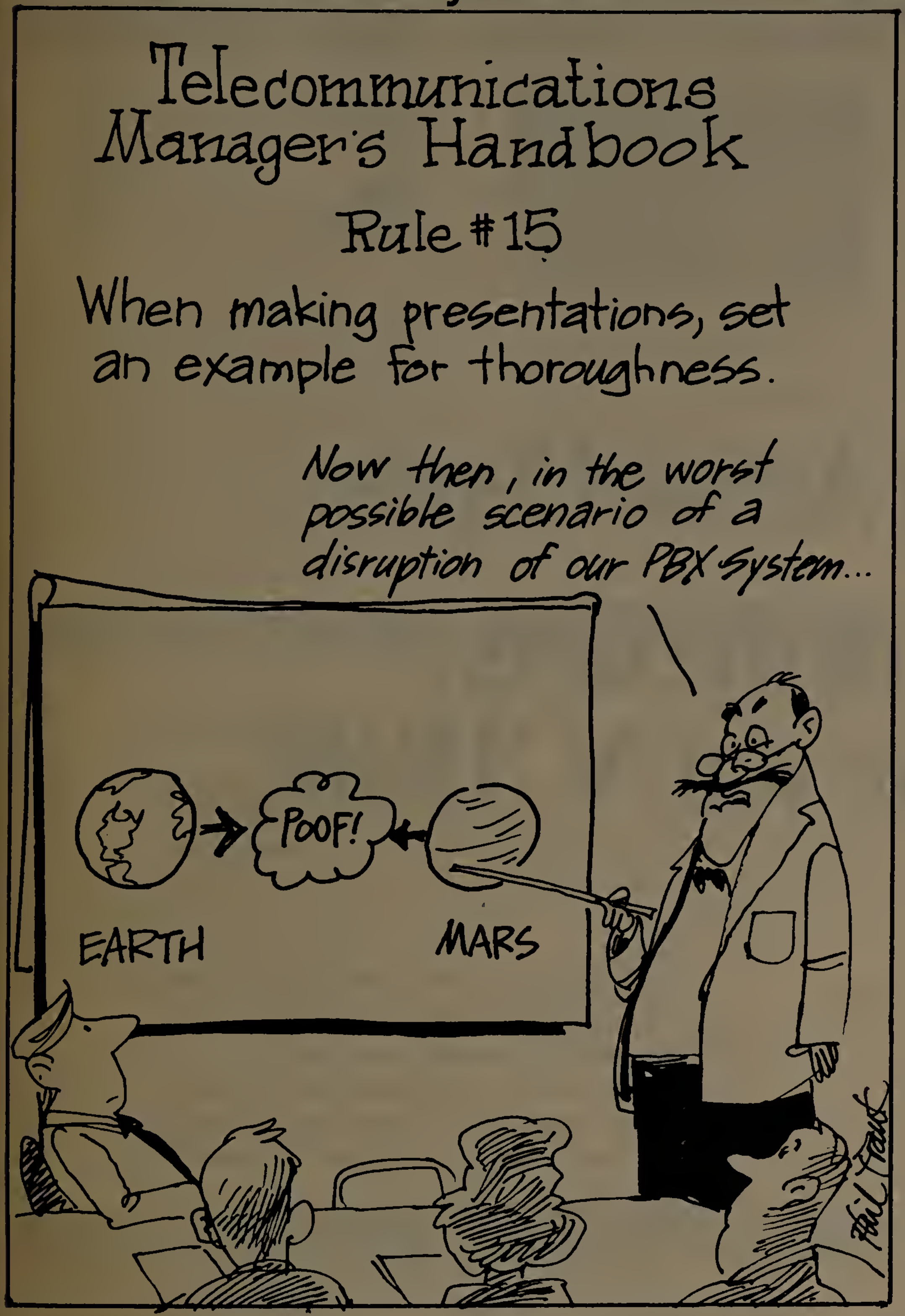
Contact Steve Moore, features editor, *Network World*, Box 9171, Framingham, Mass., 01701, or call (617) 879-0700, ext. 732.

Opinions

▶ TELETOONS — By Phil Frank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Rule #15
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Now then, in the worst possible scenario of a disruption of our PBX System...
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EARTH
MARS
Phil Frank

duration of communications port usage — and access speed. The development of a dial rate must include a break-even analysis between dedicated and dial access so that end users can fairly determine when it's appropriate to install a dedicated line. Other accounting units measured by connection-oriented systems include boundary circuits, modems and terminals, if provided by the telecommunications organization.

This type of system is maintained using configuration management rather than by gathering statistical data from specialized performance monitoring systems. A configuration management data base contains information about the terminal connections to the network, including line and modem costs, access speed, terminal type and corporate organizational unit.

This approach offers two advantages. First, a network usage application failure won't cause the loss of necessary data. This can happen when using a performance monitoring system to track network usage. For example, Telenet Communications Corp.'s public data network collects traffic accounting information in its packet switches for later transmission to a network control center; if the switch fails, all stored accounting data is lost.

Second, configuration management systems use relatively few host resources. By contrast, performance monitoring systems such as IBM's NetView Network Performance Monitor, when used for collecting chargeback information, can burden host and communications processor capacity.

The key limitation of connection-oriented chargeback systems is that they don't distinguish between different transmission priorities. This distinction is important because sessions using different priorities consume different network resources. Network switches must be able to detect session transmission priority differences and convey the information to the chargeback system.

A connection-oriented chargeback system provides a means of recovering network costs in a way that relates allocations to resources used, thereby enabling users to make intelligent business decisions about the level of service needed.

NETWORK WORLD EDITORIAL

The guru syndrome

A common thread runs through the litany of horror stories that disillusioned corporate technical staff members tell about their managers. Consider these four depressingly familiar examples:

Item 1: A staff consultant brought on board because of her expertise in a specific networking technology joins the organization with great enthusiasm and then leaves in a huff after less than one year on the job.

The reason? The consultant asked to be given responsibility for an important network design project that was a natural for her background. The manager, citing vague objections, refused her request.

Item 2: An expert corporate technical staff is driven hard by a manager during a lengthy and complex network project proposal. Eighteen months later, staff members experience a letdown when their project, though feasible, is arbitrarily aborted by upper management.

Their demoralization is complete when they're awarded no year-end bonuses and then hear through the grapevine that their manager received a hefty one.

Item 3: A T-1 network project manager asks to travel to a week-long seminar on advanced T-1 networking techniques. The communications manager turns down the request, saying the department is so burdened with work that no one can be spared for nonessential travel.

Later, the project manager discovers his manager is attending that same conference, which it so happens is being held at a coastal resort.

Item 4: A staff member who reports to a project manager is charged with writing a proposal to integrate her company's disparate electronic mail systems. She struggles to come up with relevant, up-to-date research materials but finds her ability to do so limited by departmental spending restrictions. She communicates her frustration to the project manager when she turns in the completed proposal.

Several weeks later, she attends a meeting in the office of her boss's boss: the communications manager. In his bookcase is a wealth of expensive newsletters and technology research reports on — you guessed it — electronic mail.

These and a wealth of similar tales reveal that senior technical managers are particularly susceptible to a new strain of an old and virulent disease: the guru syndrome.

Too ambitious for their own good, managers afflicted by the guru syndrome hog all the plum projects, educational opportunities, valuable technical information and other goodies. They dispense resources stingily, delegate grudgingly and then hover over the shoulders of staff members to whom they have assigned responsibilities. They are not good to work for.

The guru syndrome is rampant in high-technology professions, where specialized knowledge has traditionally been an especially high-priced commodity. As programmers, engineers and product specialists know quite well, the way to reach higher rungs on the corporate ladder is to hoard information and leverage it to one's own advantage.

When technically expert individuals move into management positions, however, the malignant effects of the guru syndrome begin to appear: stunted staff development, high turnover, poorly executed projects and, ultimately, loss of strategic corporate technological advantages.

Are there any remedies for the guru syndrome? Yes, but they aren't at all palatable to those who are infected:

- Hand that tempting seminar trip — even if it's in Hawaii — to a junior staff consultant.
- Give that high-visibility project to your most ambitious project manager.
- Share all of your best information resources — and every ounce of your own hard-won expertise — with your staff.
- Understand the frustration your staff members feel when projects they've given their best to are delayed or shot down. Make sure you reward them for their efforts anyway.
- Hardest of all, make sure your boss knows about anything your staff members did that you couldn't have accomplished by yourself.

As users are so fond of telling vendors, no one can do it all. Sooner or later, managers who don't let bright staff members shine will be eclipsed by other managers who haven't contracted the guru syndrome.

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BUYER'S GUIDE

DSUs and CSUs

Penny-wise doesn't pay

Users who look beyond basic functionality will find that DSUs and CSUs can't be treated as commodity items.

Continued from page 1

Format (ESF) and Binary 8 Zero Substitution (B8ZS), but users will need special DSUs and CSUs to enjoy them. Some vendors are offering such products now (see Table 1 on page 29). Others have gone further by producing test equipment that can be used with DDS II and, when teamed with special DSUs, can even create secondary diagnostic channels on conventional DDS.

DSU/CSU functions

The DSU and CSU appear to be commodities because their functions, data transmission speeds and basic diagnostics are well-defined. In addition, all must comply with Bell Publication 62310 and Federal Communications Commission Part 15 and 68 regulations before they can be attached to DDS or Accunet.

The DSU converts the data stream generated by the customer's data transmission equipment (DTE) into the bipolar format required for transmission over the digital network. The CSU terminates the circuit, performs signal regeneration and handles remote loop-back testing. It also monitors the incoming signal to detect bipolar violations, ensures that the data stream does not contain 16 consecutive zeros and that the 1s density rules that govern transmission over Accunet T1.5 (that is, at least three 1s must be in every 24 bits transmitted) are not violated.

A DSU/CSU combination is needed on DDS; only a CSU is required on Accunet, since the T-1 multiplexer handles the DSU function.

The data rates at which DSU/CSUs operate must rigidly adhere to AT&T specifications. For DDS, the primary rate is 56K bit/sec, although subrate speeds of 2,400, 4.8K and 9.6K bit/sec are also supported. For T-1, the data rate in North America and Japan is 1.544M bit/sec; in Europe, it's 2.048M bit/sec. Anything violating those rules excludes the product from being used on AT&T's switched network facilities.

The DSU/CSU rudimentary diagnostics are also fairly similar. All support line loop-back tests to check the integrity and performance of the line between the customer's equipment and the AT&T central office as well as the link between near-end and far-end DSU/CSUs. Just about all of them let the user perform a DTE loop-back test to check the integrity of the link between the DSU/CSU and the originating terminal equipment.

Does such commonality, plus the requirement that all products strictly adhere to AT&T and FCC specifications, mean that different vendor products can be mixed on the same network? Absolutely, but some products use proprietary test techniques that are incompatible with those of other vendors. So before adding a Yugo-class DSU/CSU to the network, be sure it's compatible with some of the Mercedes-caliber products that might also be used.

Sophisticated testing

In addition to loop-back and self-tests that can be initiated from the front panel, users can take advantage of AT&T's Automatic Bit Access Test System (ABATS) and Customer Test Service (CTS) testing services, provided the DSU/CSU is compatible with them.

The ABATS test centers operate in conjunction with local phone company facilities and can check the entire network, including the DSU. The ABATS line loop-back test returns the bipolar signal from the remote CSU. Its digital loop-back test checks the entire network back to the remote DSU's DTE interface. Because the test data is looped back through the DSU, the test center can verify the data after it has been decoded, reclocked and retransmitted. ABATS tests are inband and disrupt data flow, however.

Unlike ABATS tests, which are performed primarily by AT&T personnel, the CTS allows the user to identify the network problem and isolate its cause. Users access CTS through an asynchronous terminal and dial-up connection to a CTS computer located in Chicago. AT&T permits users to initiate loop-back tests in both directions and also to test the DSU/CSU.

CTS is available on interstate DDS circuits only and performs disruptive tests on point-to-point and multipoint circuits. To soften the impact of disrup-

Continued on page 30

Hunter is president of TMS Corp., a telecommunications consulting firm in Devon, Pa.

DSU/CSU products for AT&T's Dataphone Digital Service (DDS)

Table 1

					Diagnostic facilities							
Vendor	**Model**	**Type**	**Data rate (bit/sec)**	**DTE interface**	**Loop-back (line)**	**Loop-back (DTE)**	**Self-test**	**ABATS compatibility**	**Remote diagnostic facilities**	**DDS II Secondary Channel**	**Other features**	**Price**
Alcatel N.V. **Raleigh, N.C.**	DSU-A	DSU/CSU	2,400, 4.8K, 9.6K, 19.2K, 56K	RS-232-C, CCITT V.35, RS-449	X	X	X	X				$700
Amdahl Communications, Inc. **Richardson, Texas**	DSU-II 56	DSU/CSU	56K	CCITT V.35	X	X	X			X	Secondary channel is clear channel; can be used for traffic other than diagnostics	$1,350
	DSU-II 96	DSU/CSU	2,400, 4.8K, 9.6K	RS-232-C	X	X	X			X	Secondary channel is clear channel; can be used for traffic other than diagnostics	$1,050
AT&T Communications and Information Systems Group **Morristown, N.J.**	2600 Series	DSU/CSU	2,400, 4.8K, 9.6K, 56K	RS-232-C, CCITT V.35	X	X	X	X	X		One model supports AT&T's Switched 56 service; can be managed by DDS II	$950
	2700 Series	DSU/CSU	2,400, 4.8K, 9.6K, 56K	RS-232-C, CCITT V.35	X	X	X	X	X	X	One model supports AT&T's Switched 56 service; can be managed by DDS II	$1,890
Codex Corp. **Canton, Mass.**	2131	DSU/CSU	2,400, 4.8K, 9.6K	RS-232-C	X	X	X	X				$700
	2132	DSU/CSU	19.2K, 56K	CCITT V.35	X	X	X	X				$1,090
Datatel, Inc. **Cherry Hill, N.J.**	DCP 3080/3180	DSU/CSU	2,400, 4.8K, 9.6K, 19.2K, 56K	RS-232-C, CCITT V.35	X	X	X	X				$735
	DCP 3800	DSU/CSU	2,400, 4.8K, 9.6K, 19.2K, 56K	RS-232-C, CCITT V.35, RS-422	X	X	X	X		X	Network management system with interface to personal computer	$4,800
DEI-Teleproducts **Escondido, Calif.**	1300	DSU/CSU	2,400, 4.8K, 9.6K	RS-232-C	X	X		X				$675
Digital Communications Associates, Inc. **Alpharetta, Ga.**	DSU-A	DSU/CSU	2,400, 4.8K, 9.6K, 19.2K, 56K	RS-232-C, CCITT V.35, RS-449	X		X					$875
Dynatech Communications, Inc. **East Greenwich, R.I.**	Omni Serv 2200	DSU/CSU	2,400, 4.8K, 9.6K, 19.2K, 56K	RS-232-C, CCITT V.35, diagnostic port (RS-232-C)	X	X	X	X	X	X	Can be used as extended-range LDM; extensive remote diagnostic facilities	$950
General DataComm, Inc. **Middlebury, Conn.**	Datacomm 501 C/D/E XR	DSU/CSU	56K	CCITT V.35	X	X	X	X	X	X		$825
	Datacomm 500 C/D/E XR	DSU/CSU	2,400, 4.8K, 9.6K	RS-232-C	X	X	X	X	X	X		$725
Infinet, Inc. **North Andover, Mass.**	IDM 500	DSU/CSU	2,400, 4.8K, 9.6K, 19.2K	RS-232-C	X	X	X		X		Diagnostic channel; redundant hardware	$1,895
	IDM Switched 56	DSU/CSU	56K	CCITT V.35	X	X	X		X		AT&T's Switched 56 service compatibility; diagnostic channel	$2,495
Paradyne Corp. **Largo, Fla.**	3056 BSU	DSU/CSU	2,400, 4.8K, 9.6K, 56K	RS-232-C, CCITT V.35	X	X	X		X		Remote diagnostic channel; can be upgraded to DDS II; network management system	$1,090
Penril DataComm **Gaithersburg, Md.**	CSU/DSU 56	DSU/CSU	2,400, 4.8K, 9.6K, 56K	RS-232-C, CCITT V.35	X	X	X	X	X		Remote disable facility	$795
	CSU/DSU 96	DSU/CSU	2,400, 4.8K, 9.6K	RS-232-C	X	X	X	X				$425
Racal-Milgo, Inc. **Sunrise, Fla.**	CMS DSU 500 RD	DSU/CSU	2,400, 4.8K, 9.6K	RS-232-C	X	X	X	X	X		Remote control unit allows user to configure remote CSUs; can be upgraded to DDS II	$1,250
	CMS DSU 1556	DSU/CSU	56K	CCITT V.35	X	X	X	X		X		$1,650
Teleprocessing Products, Inc. **Simi Valley, Calif.**	TP 2502	DSU/CSU	2,400, 4.8K, 9.6K	RS-232-C	X	X	X	X		X	DDS network management system available	$1,250
Universal Data Systems, Inc. **Huntsville, Ala.**	DDS-2 96	DSU/CSU	2,400, 4.8K, 9.6K	RS-232-C	X	X	X	X		X		$795
	DDS/MR	DSU/CSU	2,400, 4.8K, 9.6K, 56K	RS-232-C, CCITT V.35, EIA 530	X	X	X	X			Supports AT&T's Switched 56 service	$695

ABATS = Automatic Bit Access Test System
CSU = Channel service unit
DSU = Data service unit
DTE = Data terminal equipment
LDM = Limited-distance modem

SOURCE: TMS CORP., DEVON, PA.

CSU products for T-1
Table 2

Vendor	Model	Type	Data rate (bit/sec)	DTE interface	Diagnostic facilities: Loop-back (line)	Diagnostic facilities: Loop-back (DTE)	Diagnostic facilities: Self-test	Diagnostic facilities: B8ZS support	Diagnostic facilities: Remote diagnostic facilities	Diagnostic facilities: ESF	Other features	Price
Avanti Communications Corp. Newport, R.I.	TPAC 1.5	CSU	1.544M	CCITT V.35, RS-449, Mil. Std. 188/114, E&M 1 through 4 for voice inputs	X	X	X	X	X		Performs framing and speed conversion needed to allow non-T-1 inputs to run on AT&T's Accunet service.	$4,995
	Acupac	CSU	1.544M	CCITT V.35, RS-449, Mil. Std. 188/114	X	X	X	X	X		Performs framing and speed conversion needed to allow non-T-1 inputs to run on AT&T's Accunet service.	$3,595
Kentrox Industries, Inc. Portland, Ore.	T-Serv T-1 CSU	CSU	1.544M	NA	X	X	X				Extended loop-back testing facilities	$1,350
	T-Smart	CSU	1.544M	NA	X	X	X	X		X	Extended loop-back testing facilities	$2,850
Larse Corp. Santa Clara, Calif.	TDSU	DSU/CSU	1.544M	CCITT V.35, RS-422, RS-449	X	X	X	X			Clear channel module; extensive diagnostic set	$4,995
	TNDS	CSU	1.544M	NA	X	X	X	X	X	X	Extensive set of isolation tests	$2,195
Phoenix Microsystems Huntsville, Ala.	1536	CSU	1.544M	CCITT V.35, RS-449	X	X	X	X			Low channel conversion; used for CAD/CAM, CAE; multiplexing	$2,715
	1544	CSU	1.544M	NA	X	X	X	X				$995
Scitec Corp. Middletown, R.I.	Integrator 1544	DSU/CSU	1.544M	CCITT V.35, RS-449	X	X	X	X				$4,500
	Saturn D4	DSU/CSU	1.544M	CCITT V.35, RS-449	X	X	X	X				$3,500
Teleprocessing Products, Inc. Simi Valley, Calif.	TP 1544	CSU	1.544M	NA	X	X	X					$1,795
Tellabs, Inc. Lisle, Ill.	4110 CSU	CSU	1.544M	NA	X		X	X	X		Direct asynchronous terminal hookup for diagnostics; ESF available through separate unit	$1,100
Verilink Corp. Sunnyvale, Calif.	551V	CSU	1.544M	NA	X	X			X		Network management controller available	$1,050
	551VST	CSU	1.544M	NA	X	X	X	X	X	X	Network management controller available	$1,800

B8ZS = Binary 8 zero suppression
CAD/CAM, CAE = Computer-aided design/manufacturing and engineering
CSU = Channel service unit
DSU = Data service unit
DTE = Data terminal equipment
ESF = Extended superframe format
Mil. Std. = Military standard
NA = Not available

SOURCE: TMS CORP., DEVON, PA.

From page 28

tive testing, AT&T allows users to specify in advance the circuits to be tested and the times when the tests will be done.

Users take control

While CTS provides for some user control, it still involves test scheduling and use of AT&T facilities, and some users may find that unacceptable. The biggest skeptics are likely to be those users who have dealt with AT&T regional test centers to get DDS problems fixed.

One telecommunications manager with a large service company spoke bitterly about the hassle he encountered just getting normal problems resolved. This user, who asked not to be identified, says it took several calls just to reach the DDS test center and then up to a half-day just to get the test performed. "During that period, the offices affected were operating with degraded service or no service at all. Poor [quality] lines were the reason we switched from analog to digital to begin with, so I was unhappy, and so were the users," he says.

That company has since moved to private test equipment, and many other users may follow shortly. According to Larry Cynar, an industry analyst with the San Jose, Calif.-based Dataquest, Inc., "Network management will be the hot topic in 1988."

One thing that will spur the use of independent test gear will be the availability of AT&T's DDS II, which will permit users to perform nondisruptive tests over the secondary channel. Another will be the acceptance of products such as AT&T's SC Series, Datatel, Inc.'s DCP 3800 and Teleprocessing Products, Inc.'s Multidrop Network Management System (MNM), all of which operate with DDS II facilities.

One thing that will spur the use of independent test gear will be the availability of AT&T's DDS II.

DDS II is the answer to network managers' prayers for a facility that allows testing and monitoring similar to that which can be obtained with modems with secondary channels. Those modems allow nondisruptive tests to be performed by employing a separate low-speed channel to shuttle test and diagnostic commands between a central monitor and designated modems. Some of the more sophisticated products even allow defective modems to be isolated from the network.

Digital networks are now just beginning to see such capabilities with products such as the SC Series, DCP 3800 and MNM. All work only with their vendor-specific DSUs with secondary channel facilities, and all permit users to conduct tests on point-to-point and multipoint polled networks.

What's particularly nifty about the DCP 3800 and MNM is that they can also create their own pseudo-secondary channels on conventional DDS circuits. Since it could be some time before DDS II is available to everyone that needs it, those two products allow users to create a similar service now.

DCP 3800 and MNM use different techniques to establish the pseudo, or virtual, secondary channels, but both accomplish this in essentially the same way: by multiplexing test data along with user data.

Such tests are nondisruptive, since normal data transmission can continue, but they could degrade throughput, since some data bits are stolen to carry out the tests.

According to Datatel, the pseudo-secondary channel uses 133 bit/sec when operating over a 4.8K bit/sec channel and 267 bit/sec on a 9.6K bit/sec link. Teleprocessing Products says no "bit-robbing" is done with the MNM, since statistical multiplexing is used to create a pseudo channel.

While the DCP 3800 does steal bits, the impact on throughput apparently hasn't been too great — at least for some users. John Scoggin Jr., superviser of network operations and telecommunications for Delmarva Power & Light Co. in Newark, Del., says he's using pseudo-secondary channels on 9.6K bit/sec digital links and has heard no complaints about degraded throughput or longer response times.

Futures

Some CSU vendors are looking

ahead by providing support for B8ZS and ESF services (see Table 2 on page 30). Both are intended for T-1 applications and, once fully implemented by AT&T on Accunet, will enhance network performance. ESF replaces the normal T-1 12-frame superframe with one that's 24 frames long, and it creates two additional signaling bits in frames 18 and 24. Together, they take 6K bit/sec from the T-1 composite bandwidth.

The first bit is used for cyclic redundancy checks (CRC) to monitor error conditions on the T-1 network and uses 2K bit/sec of the composite bandwidth. The second signaling bit creates a 4K bit/sec data channel and is used to carry out-of-band signaling.

While ESF is now tariffed, the Bell operating companies haven't exactly been rushing to adopt it. Since ESF is incompatible with their installed T-1 transmission equipment (which uses D4 framing and signaling), expensive modifications or complete changeovers would be required. The BOCs' reluctance might also be influenced by customer attitudes toward ESF in general.

"Many view ESF as something that'll help the carrier more than them," says Mark LaRow, a group manager with Network Strategies, Inc. in Fairfax, Va. Many also feel that they're losing 6K bit/sec of bandwidth, and that also doesn't sit well. LaRow says that's a bit shortsighted, since users will gain overall by improved service.

Some sophisticated users aren't waiting for carrier ESF to become available and are implementing the CRC feature on private networks.

If DDS II, ESF or B8ZS are future possibilities, managers should go for products that support them.

Many CSUs and T-1 multiplexers now support ESF ("They're not the same old bit-pushers anymore," *NW*, Jan. 11), and, since CRC constantly monitors the condition of T-1 lines by counting errors, customers can use those statistics as evidence when complaining to the carrier about poor-quality lines.

B8ZS allows users to get around the 15 consecutive zeros restriction imposed on Accunet users. (For a T-1 data stream to run on Accunet T1.5, no more than 15 consecutive zeros are permitted, or timing problems will occur on the network.) The B8ZS facility monitors the data stream for zero density violations and, when detected, substitutes the data with two consecutive 8-bit byte bipolar violations. Receiving equipment compatible with B8ZS recognizes those violations and converts the data back to its original transmitted format.

Before rushing to implement B8ZS, users should ensure that the AT&T transmission equipment will support it. "The M13 multiplexers used in some AT&T locations might not have been converted to pass B8ZS," says Tim Zerbiec, vice-president of technology for Vertical Systems, Inc., a consulting company located in Dedham, Mass. "AT&T says the M13s will be converted on a repair-as-needed basis or when new carrier systems are required. It could be a while," he says.

What to buy

Since DSUs and CSUs have so many functions in common and are required to meet AT&T and FCC specifications concerning operating characteristics, many users might be tempted to buy on price alone. That's a big mistake, since some products offer sophisticated proprietary diagnostics as well as handling the newer AT&T facilities.

Others may feel that a single vendor policy would be a better bet to eliminate finger pointing when problems occur. This also could be an expensive error, unless the user's technical staff members are so poorly trained that they can't deal with vendor and carrier personnel.

Managers should buy smart. If the current network is running at 9.6K bit/sec, but there's a possibility that it might move to 56K bit/sec, they should go for the full range DSU. If DDS II, ESF or B8ZS are future possibilities, they should go for products that support them. Communications managers will pay more initially, but they won't end up tossing away obsolete units.

Letters:

Editor:

I feel I must respond to the article about the Federal Communications Commission's proposed access charges for private network users that appeared in the Nov. 30 issue of *Network World* ("FCC proposes private net access charges").

Dennis Patrick's concept of having private network users pay $25 per month per access line if they terminate their calls through the local Bell operating company's exchanges is fraught with serious misconceptions.

First of all, how can the local exchanges monitor the calls and determine where they originated? Usually, the private network does not have any means to insert calling-number identification along with the dial digits for easy verification that the call originated within the local exchange's area.

Determination of call origination would essentially be left up to the private network user to report monthly usage statistics to the local exchange. This does not seem to be a practical solution.

As the FCC sees the issue, certain areas served by local public exchanges have flat-rate zones, in which private network calls can be terminated at bargain basement rates. Ostensibly, private networks are taking advantage of the local BOCs by completing their calls to customers over flat-rate lines that link the private branch exchange to the central office switch.

Well, not all local exchange areas have flat-rate zones. In fact, today, one would not be able to obtain flat-rate local service from New York Telephone Co. The general direction the BOCS are taking today is to move away from flat rates and offer Message Toll Service (MTS) instead.

Getting down to the actual configuration of private network connections to the local exchanges, one must pay a monthly access charge for the outbound trunks. Typically, trunks are used to interconnect the private network's tandem switches with the local exchange's serving switch.

There are several ways a private network can be arranged for connection to the public network. Tie lines are a common trunk facility for this connection. There is a monthly access charge for this type of trunk that is paid by the private network user every month.

Another way is to install foreign exchange lines between the private network's tandem switch and the local exchange.

Usually the local exchange is in a distant city in which a considerable number of calls terminate every month. In this case, a long-distance carrier arranges for the installation of the foreign exchange line and bills the user. A part of the monthly bill includes the local exchange's charge for the local access of the foreign exchange line. The calls placed over this line are metered by the local exchange at MTS rates, and the user is billed for them.

I can offer an alternative to Patrick's proposal. Simply eliminate flat-rate billing in all areas of the country and replace it with MTS or a form of bulk discounted service, such as Band 0 WATS.

In both cases, the private network pays the monthly line-access charge as well as a usage charge. The local public exchange carrier would then be guaranteed fair payment for service in handling the calls.

In summary then, the access charges the FCC proposes be imposed upon private networks for calls completed through local exchange flat-rate areas are quite unnecessary. The physical trunk facilities connecting the private network and public network are not free of charge. There is always the monthly access fee that is paid by the private network user. Patrick's proposal also includes raising the usage rate to 7½ cents per minute above the current MTS rates everybody is charged. Why should private network users be charged more than the general public?

Harry Regis
Assistant vice-president
Network engineering
Merrill Lynch, Pierce,
Fenner & Smith, Inc.

Editor:

We thought your article concerning Merrill Lynch Teleport Technologies, Inc. (MLTTI) and its plans to fund the development of metropolitan-area networks in a number of cities was excellent ("Firm forms bypass net subsidiary," *NW*, Dec. 28, 1987/Jan. 4, 1988).

However, your headline and lead paragraph erroneously indicated that the companies of the Teleport Communications Group will be in the "bypass" business competing with the regional Bell operating companies. Based on Teleport Communications Co.-New York's (TC-NY) two years of operating experience, that will not be the case.

Today, no more than 9% of TC-NY's capacity in service is used to link end users with a long-distance carrier (that is, bypass). About 71% of TC-NY's capacity is used for high-capacity point of presence-to-point of presence (POP-to-POP) links between long-distance carriers.

For these applications, TC-NY is competing much more with the "build-it-yourself option" than with the local exchange company.

Indeed, we believe that one of the major reasons the long-distance carriers want alternatives to RBOCs is that they don't want these critical POP-to-POP links to be supplied by companies that want to be their major competitors in the long-distance business.

I would also like to point out that MLTTI is currently evaluating which cities it wants to build networks in and whether or not it should develop networks as joint ventures. The speculations in the article about particular arrangements are just that. We will make detailed announcements of our plans only when they are firm.

Robert C. Atkinson
Vice-president
Regulatory and
external affairs
Merrill Lynch Teleport
Technologies, Inc.

Letters may be edited for space and clarity.

Timeplex X.25 line

continued from page 2

pability to do all its call processing and network management functions," said Sayuri Tung, Timeplex's product manager for the Timepac line.

Both switches feature optional data encryption and, for asynchronous ASCII connections, data compression capability at a 2-to-1 ratio.

No other packet switches offer those capabilities, according to Frank. "I don't know if they'll sell, or if there is a real market for them, but they are definitely unique," he said.

The switches have built-in network management features that provide performance statistics and diagnostic reports, such as port and circuit status, configuration, billing information on a per-call basis and alarms. Any ASCII terminal can be used as a supervisory terminal, according to Tung. Timeplex also plans an interface to the second release of its Time/View network management software, expected in the second half of this year.

Both synchronous and asynchronous protocols are supported, including CCITT X.25, IBM's Synchronous Data Link Control and 3270 Binary Synchronous Communications.

The cost of the NP500 and NP100 packet switches start at $12,945 and $4,990, respectively.

TA48 and TS8 PADs

The two PADs included in the Timepac announcement are the Timepac PAD TA48 and Timepac PAD TS8. The asynchronous TA48 PAD features 48 ports and one or two X.25 data links. The TS8 is a synchronous PAD connecting up to eight devices to one or two X.25 links.

The asynchronous PAD is priced at $1,250, while the synchronous PAD costs $4,990.

Analysts warned that even if the products are technically competitive, it is difficult to gain a foothold in the packet-switching market.

"The vendors in this market now are very well entrenched," said Kathryn Korostoff, senior analyst at International Data Corp., a Framingham, Mass.-based market research firm. "While Timeplex has a lot of existing users that may be interested in these products, I think they'll have a hard time selling them outside the Timeplex installed base."

US Sprint begins rollout

continued from page 10

tracts. The carrier said it has set several discount levels for bulk use of the service, but would not disclose them.

The company also claimed that the T-1 service will be widely available, but would not say how many Clearline T1.5 network points of presence it will establish.

US Sprint officials said Clearline Voiceband, a 64K bit/sec service, would be introduced next. This voice-grade private-line service comprises analog local access and digital facilities between US Sprint points of presence. This service will support voice and data transmission.

The carrier also plans to announce a series of digital data services operating at speeds from 2,400 bit/sec to 56K bit/sec and at 45M bit/sec, as well as Clearline 45, a service that will operate at 45M bit/sec.

AT&T already offers a T-3 service, which is used primarily by its largest accounts.

US Sprint's new T-1 offering will be provided over a uniform network of Digital Access and Cross-Connect Systems (DACS). US Sprint already offers a stripped-down T-1 service that does not use any DACS equipment. The carrier said DACS would be installed at 45 network locations initially. The majority of the DACS gear in the US Sprint network was built by Digital Switch Corp. of Plano, Texas.

Dennis Dougherty, digital private-line service group marketing manager for US Sprint, explained that DACS provides the carrier with an enhanced circuit monitoring capability. This enables US Sprint to monitor, maintain and rapidly isolate faults in circuits from its recently completed National Private Line Service Center in Atlanta.

"DACS also allows us to detect degradation in circuit quality and take corrective measures," he added.

The carrier also plans to announce a series of digital data services operating at speeds from 2,400 bit/sec to 56K bit/sec and at 45M bit/sec, as well as Clearline 45.

US Sprint said the service objective for link availability end-to-end is 99.7%. Availability of the local access portion of the link is 99.9%, and availability of its long-haul portion of the link is 99.85%. Availability, however, is not guaranteed. The carrier would not disclose service objectives for bit error rates.

The T1.5 service will use the D4 framing format. US Sprint said it will not initially support Extended Superframe Format (ESF) but added that it will eventually support ESF throughout its network.

ESF will enable US Sprint to monitor signal presence and quality from the Atlanta center. US Sprint plans to allow Clearline T1.5 users to access circuit diagnostic data. Further down the road, the carrier will enable users to attach their own ESF equipment to the network.

US Sprint claimed it would test all Clearline T1.5 circuits before they are cut over. All US Sprint's digital fiber-optic cable and microwave networks will be monitored from the Atlanta center.

US Sprint will guarantee that the T-1 circuit between the carrier's points of presence will be established over fiber-optic cable. However, users will only be able to create an end-to-end fiber link where the local exchange carrier can provide local access via fiber. The carrier also said it will, where possible, provide alternate routing of user traffic, in the event of a cable cut or switch failure.

US Sprint users said the T1.5 service is a strong step in the right direction for the carrier. But, they added, US Sprint has to develop a track record of providing high quality, reliable T1.5 service without long lead times to users before they would buy the service.

Unisys's Haerland said reliability and the level of support provided for the service are more important than the savings realized by using the T1.5 service.

"When a company sends critical data over a private line, it puts its well-being at the mercy of the T-1 vendor," Haerland said. "If a voice line goes down, you can dial the call again.

"But if a data line goes down, you better have dedicated backup facilities to carry the data," he said. "Very few users can afford private-line backup for their entire data network, because it's extremely expensive."

Another US Sprint user, Dave Edison, corporate information and communications director for Westinghouse Corp. in Pittsburgh, said the quality of the new T1.5 service is more important to the company than the money the company might save by replacing AT&T T-1 line with Clearline T1.5 service.

US Sprint's ability to restore service in the event of a cable cut or switch failure is also a key issue, Edison said.

"DACS in the network will allow US Sprint to switch traffic onto a new circuit when the primary circuit is lost, without missing a beat," he explained.

The Most Versatile And Cost-Effective T1 Link For Your LANs?

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Apple, DEC camps unite

continued from page 1

products, but said they would work together to achieve a number of connectivity goals, including support of file sharing, electronic mail and document interchange between VAXes and Macintoshes.

The companies said the agreement was prompted by the growing number of users with both DEC and Apple networks. "This is a true customer-driven alliance," Sculley said.

Olsen agreed, saying, "Our customers insisted on this. They fell in love with Apple's networks and wanted to connect them to VAXes.

"This announcement is particularly exciting for us," he added. "It's clear Apple is the innovator in the way people interface with computers. For many years, we have been looking for ways to cooperate."

Under the agreement, Apple and DEC said they will develop products that allow:

- Macintoshes to access files on VAXes using the AppleTalk Filing Protocol.
- Macintoshes and VAXes to exchange revisable-form documents using the Digital Document Interchange Format.
- Macintosh and VAX users to share printers on AppleTalk and DECnet networks.
- Macintoshes to emulate DEC terminals, accessing processors over DECnet.
- DEC and Macintosh E-mail users to exchange messages.

DEC and Apple also said they would develop data base standards to allow Macintosh applications to access data on VAXes via DECnet. The companies will also work toward a unified network management scheme that will allow users to manage both DECnets and AppleTalk networks. Further, the companies said they would develop a methodology that supports distributed applications using "process-to-process communications methods."

DEC is expected to release more details about the agreement this week.

Olsen said the firms will publish a set of application programming interfaces to help software developers write applications that take advantage of increased DEC/Apple connectivity. The interfaces are expected to be released in August.

Industry watchers have long anticipated some formal agreement between DEC and Apple. They said DEC's networking expertise and strength in departmental systems complement Apple's line of user-friendly microcomputers.

By working with each other's products, DEC and Apple will be able to present customers with a full range of computer and communications products, industry analysts said.

"I think it's one of the most well-placed collaborations the industry has ever seen," said Thomas White, chairman and chief executive officer of Infonetics, Inc., a Santa Clara, Calif.-based research firm. "DEC has been a failure in the workstation market, beginning with the Rainbow. Apple needs a partner that has a lot of networking experience."

DEC-watcher Steve Widen, a senior analyst for International Data Corp. in Framingham, Mass., agreed. "Communications hasn't been a strong point with Apple. DEC is an ideal vendor to have an agreement with because of the company's networking strength," Widen said.

In the long term, a joint marketing agreement could be the next step in the DEC/Apple relationship, Widen said.

Joint marketing is important to corporate customers, said David Carnevale, vice-president of microsystems research at InfoCorp, a research firm in Cupertino, Calif. Rather than listening to each vendor independently offering to support the other's equipment, corporate customers "want two vendors in the same room making commitments," he said.

Analysts agree that market realities seem to have prompted the DEC/Apple collaboration. According to DEC statistics, 36% of VAX sites use Macintoshes. ◘

AT&T, NCR offer nets

continued from page 1

The companies have already tested one such integrated network at an AT&T Bell Laboratories' facility in Lincroft, N.J. The test simulated the movement of voice and data traffic between a store and a retailer's headquarters.

Data from an NCR Tower supermicrocomputer, NCR T9100 POS processor and NCR 7052/7003 POS terminals as well as voice traffic from AT&T telephones was routed to an AT&T System 75. The PBX was also used to route data traffic among POS terminals.

Also, using AT&T's Accunet T1.5 Service, a digital service operating at 1.54M bit/sec, the System 75 was linked to an AT&T System 85 PBX. Data traffic was sent from the System 85 to an IBM front-end processor linked to an IBM host running POS software.

The two companies have already begun to market integrated networks to retailers. Prices vary by user because retailers can customize their networks by choosing any combination of NCR and AT&T equipment, and AT&T transmission services.

An NCR spokesman said the two companies are offering retailers the first integrated voice and POS architecture. The spokesman said the companies do not currently have plans to expand the program to other industry segments.

Longer term, the vendors plan to add AT&T's Premises Distribution System (PDS) to the products available through the agreement. PDS is a building wiring plan that accommodates voice and data outlets and would simplify the task of moving telephone sets and POS terminals.

Robert Zimmermann, a partner at Coopers & Lybrand in New York, said NCR is the leader in the POS market, followed by IBM and National Semiconductor Corp. But the company has been losing market share to competitors, such as Fujitsu, Ltd., that have targeted products to specific market segments, such as discount chains.

To maintain its position, NCR has to offer customers more than POS equipment. Zimmermann said retailers need the type of integrated networking system NCR and AT&T described, but there are a few obstacles to widespread adoption.

First, few retailers have a management structure in place to support integrated voice and data systems. "Voice and data applications are just beginning to merge, and there are conflicts within companies over who should control those applications," Zimmermann said.

Also, many retailers are faced with the task of first consolidating various data networks. "For example, many companies have a credit authorization application running on one network and a POS application operating on a second," Zimmermann said. A growing number of retailers, such as J.C. Penney Co., Inc. and K Mart Corp., are consolidating their data networks onto backbone networks.

As retailers consolidate their networks, they are developing new types of applications. "Retailers have solved the problems of capturing and storing large amounts of sales and merchandise information," he said. "Now they have to determine how to move that information around so it best serves the corporation."

The networking successes of a few companies have forced all retailers to reexamine how they operate their businesses. "The most profound change in retailing was linking corporate networks with companies' business strategies," Zimmermann said.

He predicted the number of strategic applications will increase dramatically in the next few years. ◘

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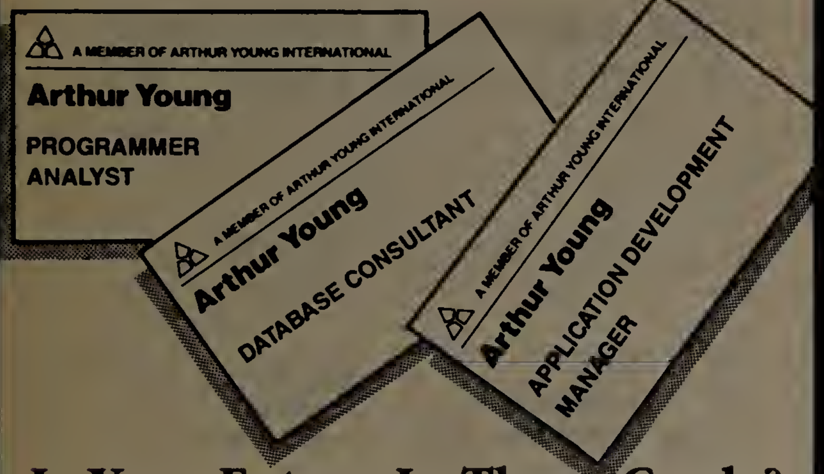
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Illinois Bell preps tariff for ISDN

continued from page 2

spends roughly $250,000 a year for station changes. That figure does not include the cost of coaxial cable used to connect terminals to its IBM and Wang Laboratories, Inc. computers.

"This is a key capability that we don't have with the AT&T System 75 PBXs we have in all our regional offices," she said.

ISDN applications McDonald's is testing include:

- **Leave word calling.** A caller who receives a busy signal or no answer when trying to reach a second party presses a keypad feature button. A message is left in the applications processor hooked to the 5ESS switch, and a light on the called party's telephone set is lit. The called party presses a feature button on the keypad to retrieve the message.
- **Electronic directory.** A user searching for another party's telephone number enters the person's last name using the telephone. The applications processor sends the number to the caller's telephone station, where it is displayed on the screen.
- **Personalized answering.** Unanswered calls are forwarded to secretaries' telephone stations. Calling party information is displayed on the screen. This data also includes who the call was intended for, what station it was forwarded from and why it was forwarded.

The company spends roughly $250,000 a year for station changes.

Mike Hrastinski, facilities and systems director for McDonald's, said widespread use of ISDN service may enable the company to eliminate its independent long-distance voice and data networks. Applications operated over ISDN lines would include collection of inventory data, employee training and distribution of payroll information.

McDonald's uses Telenet Communications Corp. packet services to support data communications to and from its several thousand restaurants. Hrastinski said the stores upload data every evening. McDonald's seven regional accounting offices are tied to facilities here with dedicated 56K bit/sec lines.

The company currently uses AT&T's Megacom service for employees wishing to call locations outside the metropolitan Chicago area. An assortment of MCI Communications Corp. and US Sprint Communications Co. WATS services are used by regional offices to call stores or headquarters. ☑

Twisted-pair debate heats up

continued from page 4

for customers to leverage their current investments in thin- and standard-cable Ethernet networks, the two companies claimed in a prepared statement.

David Systems, on the other hand, maintains that its proposed implementation offers the best signal-to-noise ratio. This capability is important for the quality of data transmission, said Heidi Iacurto, product line manager at David Systems.

According to a spokeswoman for Ungermann-Bass, one of the benefits of the HP proposal is that it allows the Ethernet signal to run in 25-pair wiring bundles along with voice or other signals. "Running in wiring bundles is important to our corporate users," she said. She added that it is common for large companies to have 25-pair wire bundles installed in their buildings.

With the final proposals in, the study group will now be turning its attention to refining the objectives the new standard must meet, said Pat Thaler, chairwoman of the study group and a development engineer at HP. The objectives list is the measuring stick against which all the proposals will be gauged, Thaler said.

To date, the vendors represented in the study group have agreed only on general objectives, she said.

"In February, we'll start comparing proposals to the objectives list and remove proposals that don't meet the objectives. By March, we hope to develop a consensus on a single proposal."

She admits this is an aggressive schedule, which may not be met. Thaler also noted that several proposals might meet the objectives list, in which case the economic feasibility of each proposal will be carefully considered.

The study group is aiming for a March proposal in order to present its findings to the full 802.3 committee, which will be meeting then.

If the 802.3 committee gives the proposal its approval, the study group will then be upgraded to a task force, charged with actually developing the specification for the standard. ☑

CALENDAR

Jan. 25, Washington, D.C. — Communication Networks '88 Conference and Exposition In-Depth Seminar Curriculum. Contact: Communication Networks '88 In-Depth Tutorial Program, P.O. Box 9171, Framingham, Mass. 01701.

Jan. 25-26, Tampa, Fla. — Introduction to Telecommunications Systems: Technologies and Applications. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

Jan. 25-29, Washington, D.C. — Application of T-Carrier to Private Networking. Contact: School of Engineering and Applied Science, George Washington University, Washington, D.C. 20052.

Jan. 26-28, Dallas — Voice Communications: A Management Perspective. Contact: AT&T, 55 Corporate Drive, Bridgewater, N.J. 08807.

Jan. 28-30, Fort Lauderdale, Fla. — Winter Convention of the National Association of Telecommunications Dealers. Contact: Frontier Computer, 4025 Bronze Way, Dallas, Texas 75237.

Feb. 2-3, 4-5, San Francisco — Data Comm I, Data Comm II. Contact: Center for Advanced Professional Education, 1820 E. Garry St., Santa Ana, Calif. 92705.

Feb. 8-9, New York — Understanding ISDN. Contact: Telecommunications Research Associates, P.O. Box 1200, Newark, Ill. 60541.

Feb. 8-10, Dallas — The IBM PS/2 Series & the IBM PC/XT Technology. Contact: Data-Tech Institute, Box 2429, Clifton, N.J. 07015.

Feb. 8-10, Washington, D.C. — Introduction to Data Communications. Contact: Systems Technology Forum, 10201 Lee Highway, Fairfax, Va. 22030.

Feb. 16-18, New York — Dexpo East '88 Conference. Contact: Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540.

Feb. 22-24, Boston — PC LANs: A Manager's Guide. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

Feb. 23-25, Chicago — Telecommunications Management. Contact: Business Communications Review, BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

Feb. 25, Houston — The Nuts and Bolts of Voice/Data Integration. Contact: Southwest Communications Association, P.O. Box 53417, Houston, Texas 77052.

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